SCM

MARCHANT

TECHNICAL TRAINING CENTERS

SUPPLEMENTAL TRAINING MATERIALS

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SCM

SUPPLEMENTAL TRAINING MATERIALS

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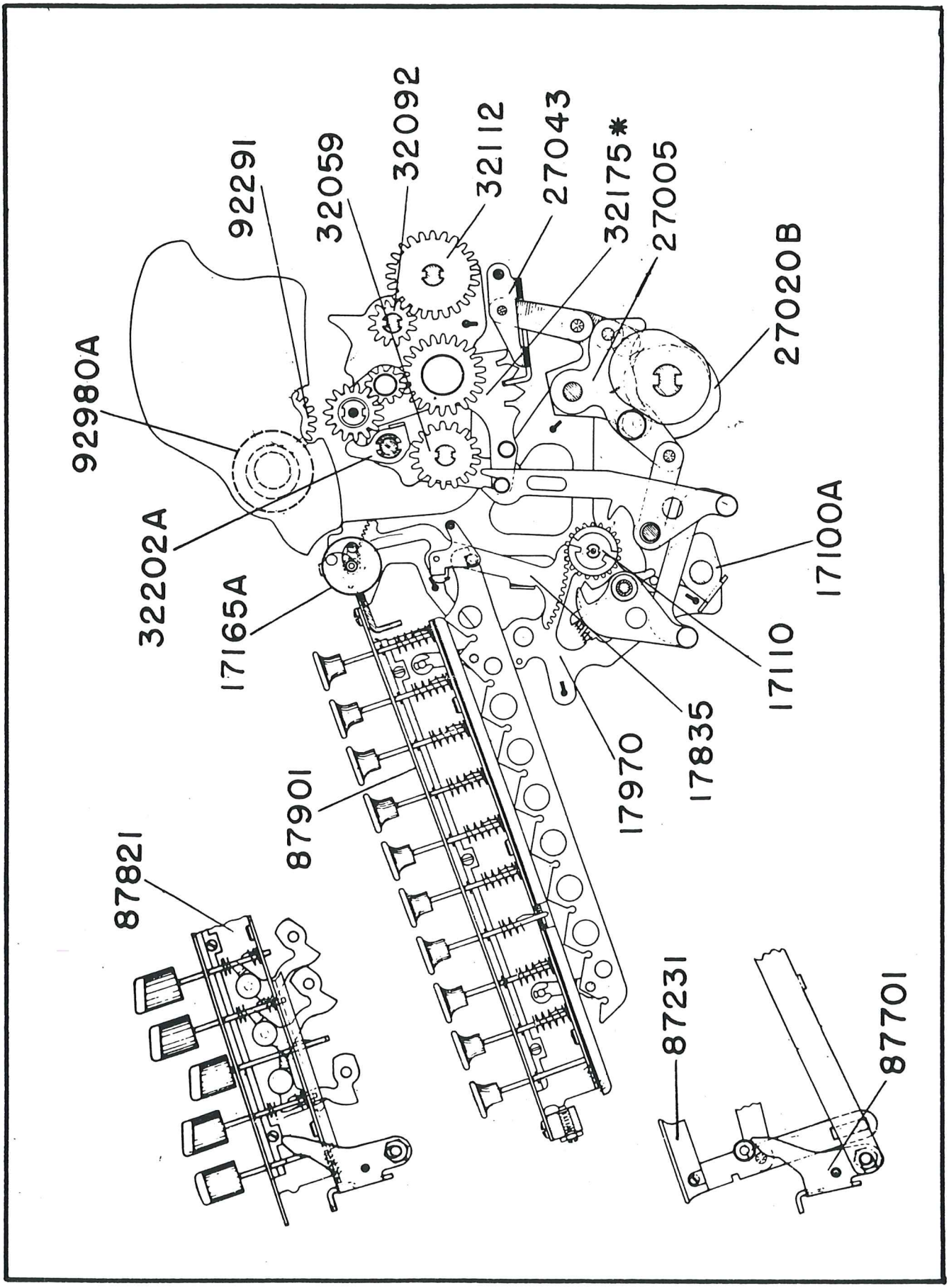
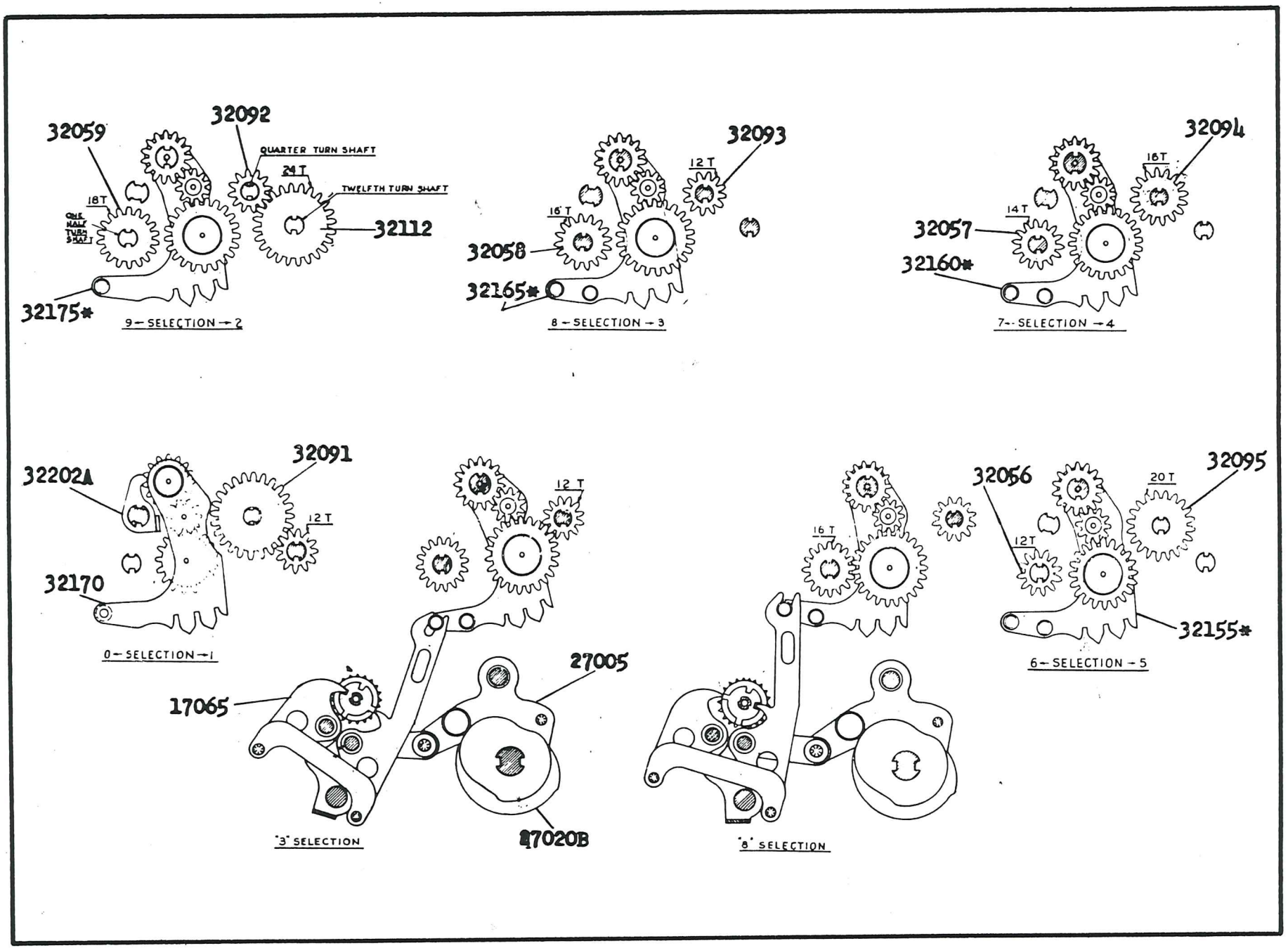
MANUAL & POWER SELECTION



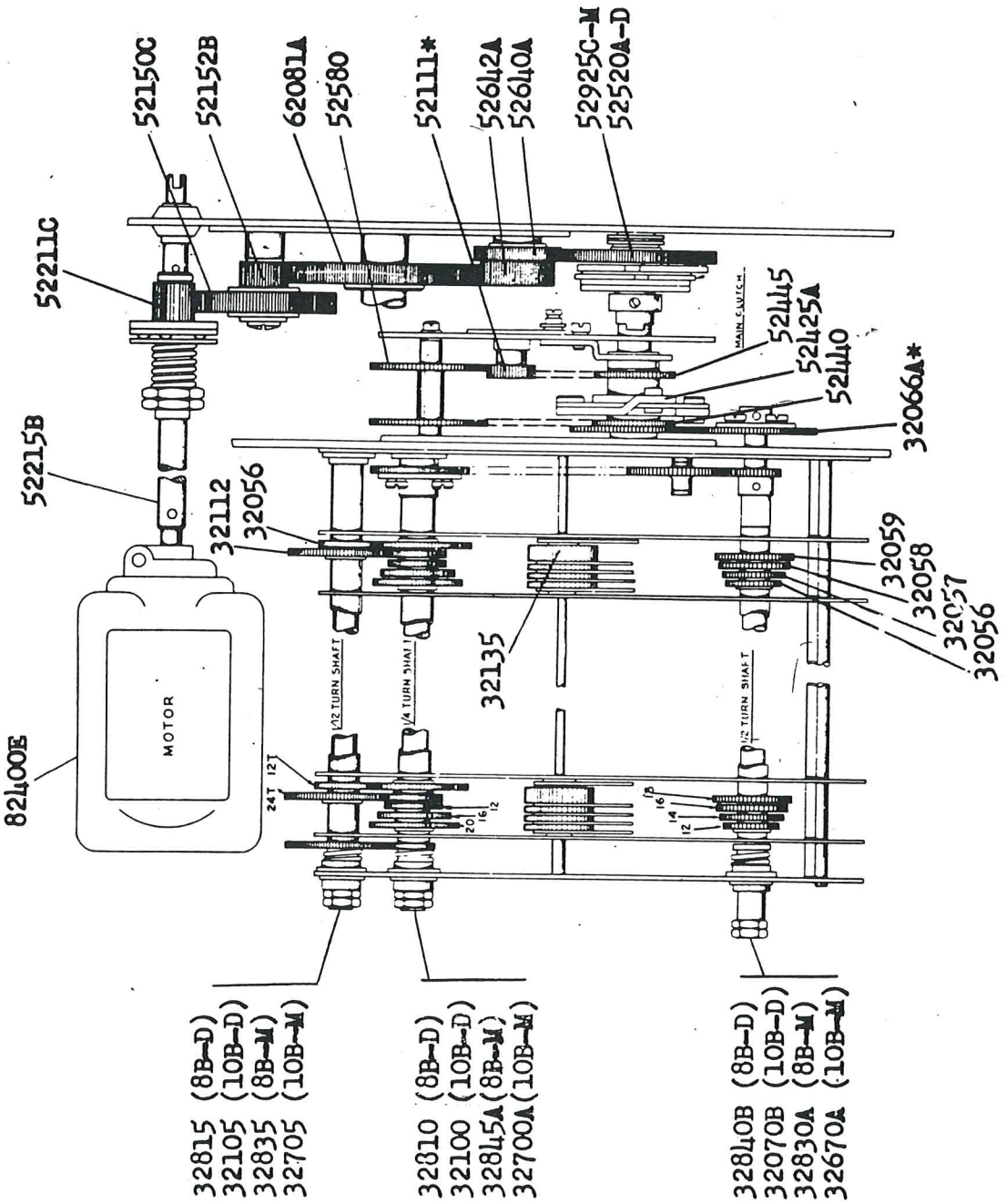
MANUAL & POWER SELECTION



SELECTION MECHANISM

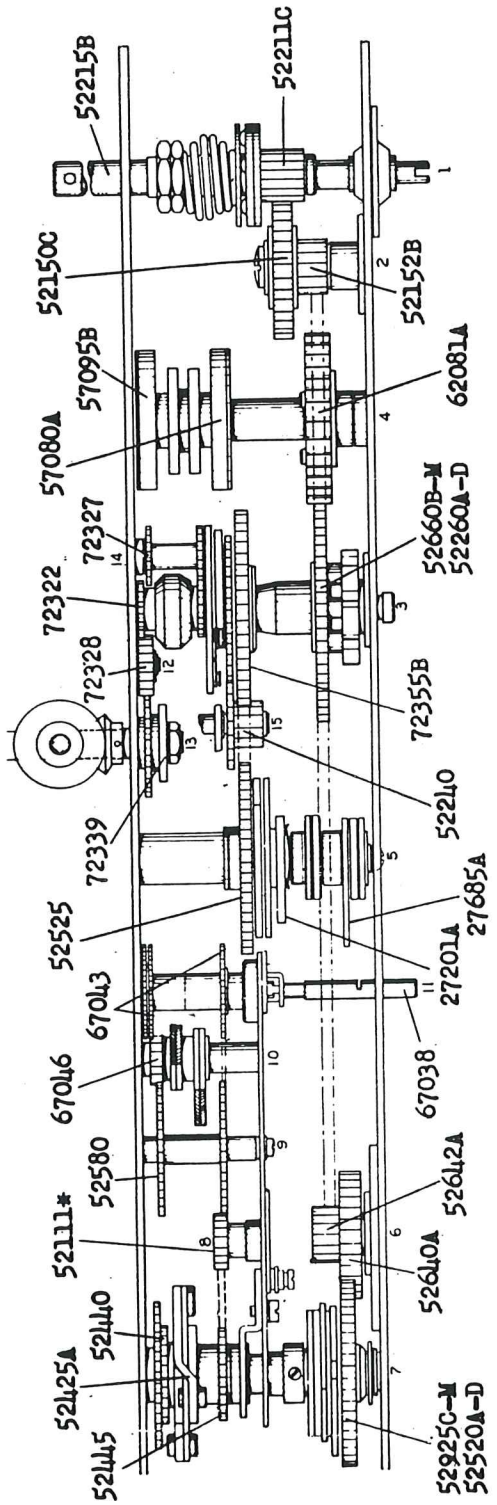
SELECTION MECHANISM

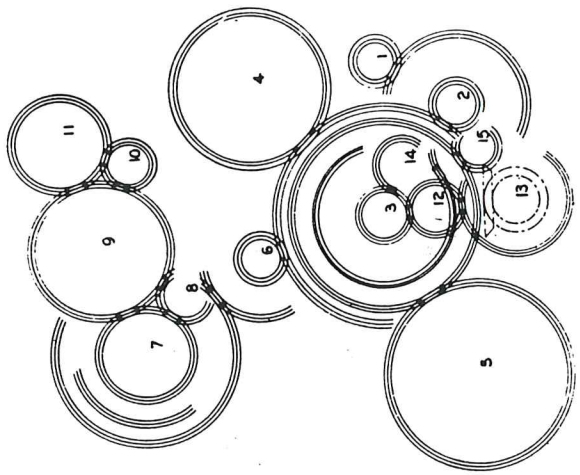
MAIN DRIVE to ACTUATOR



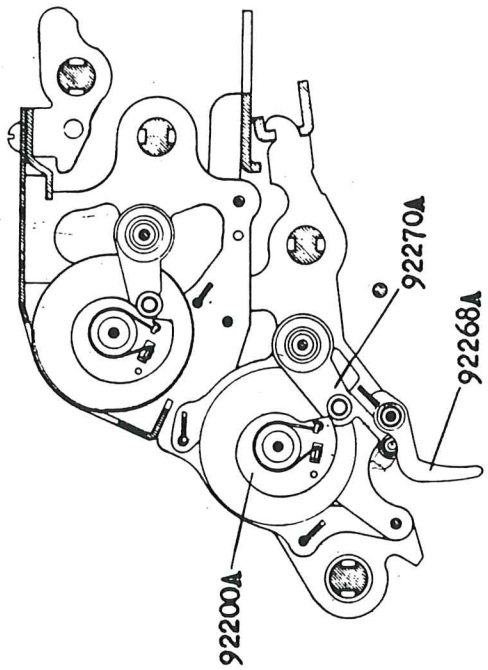
MAIN DRIVE to ACTUATOR

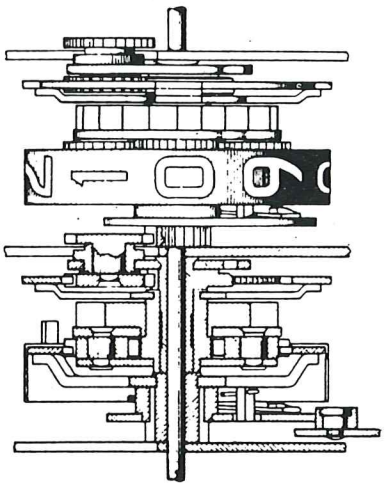
GEAR TRAIN & CLUTCHES

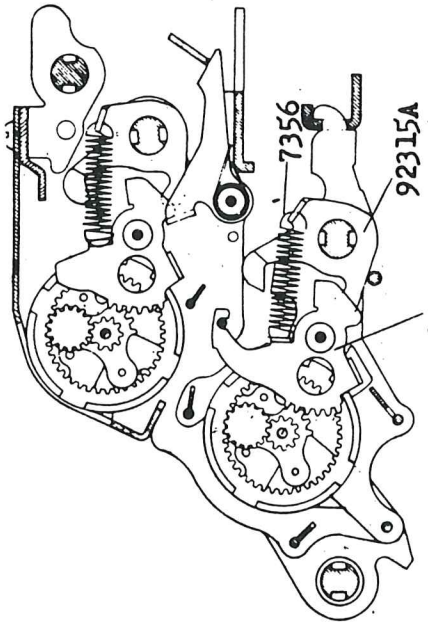


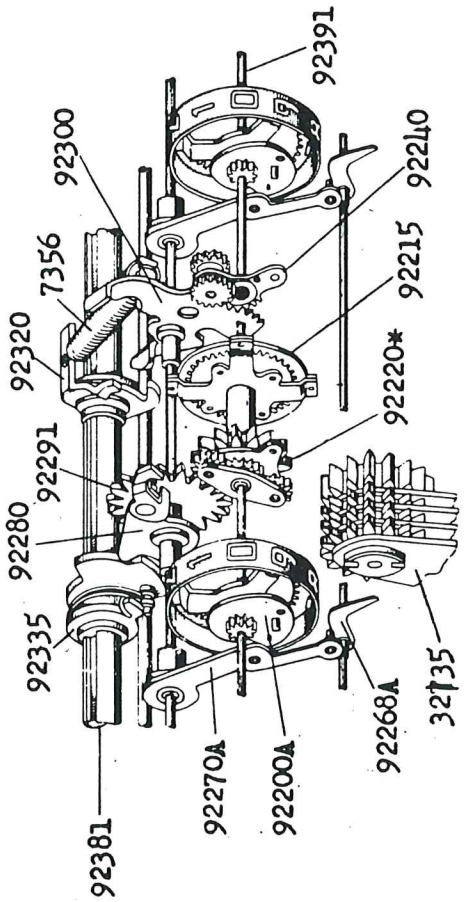


GEAR TRAIN & CLUTCHES



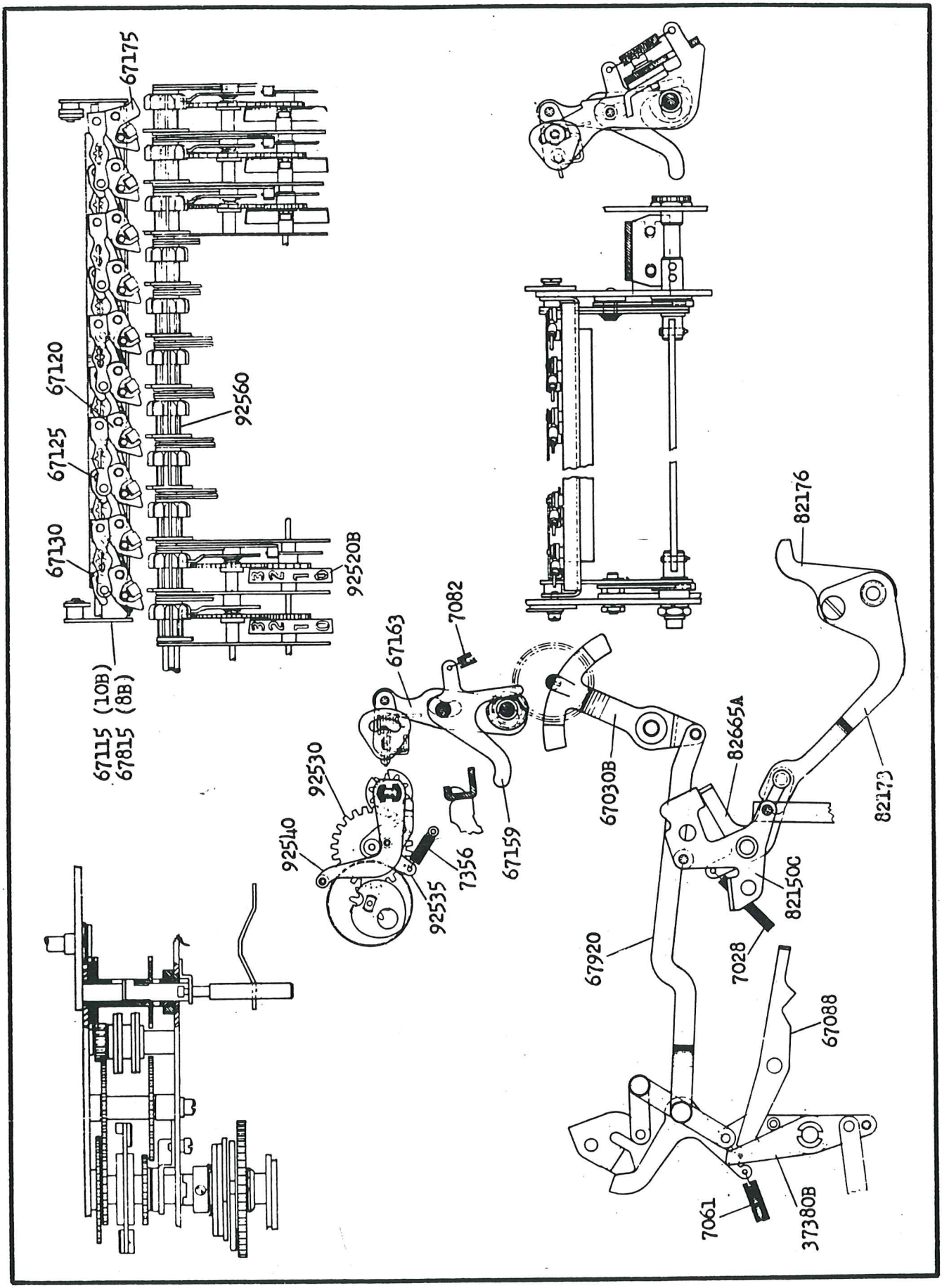




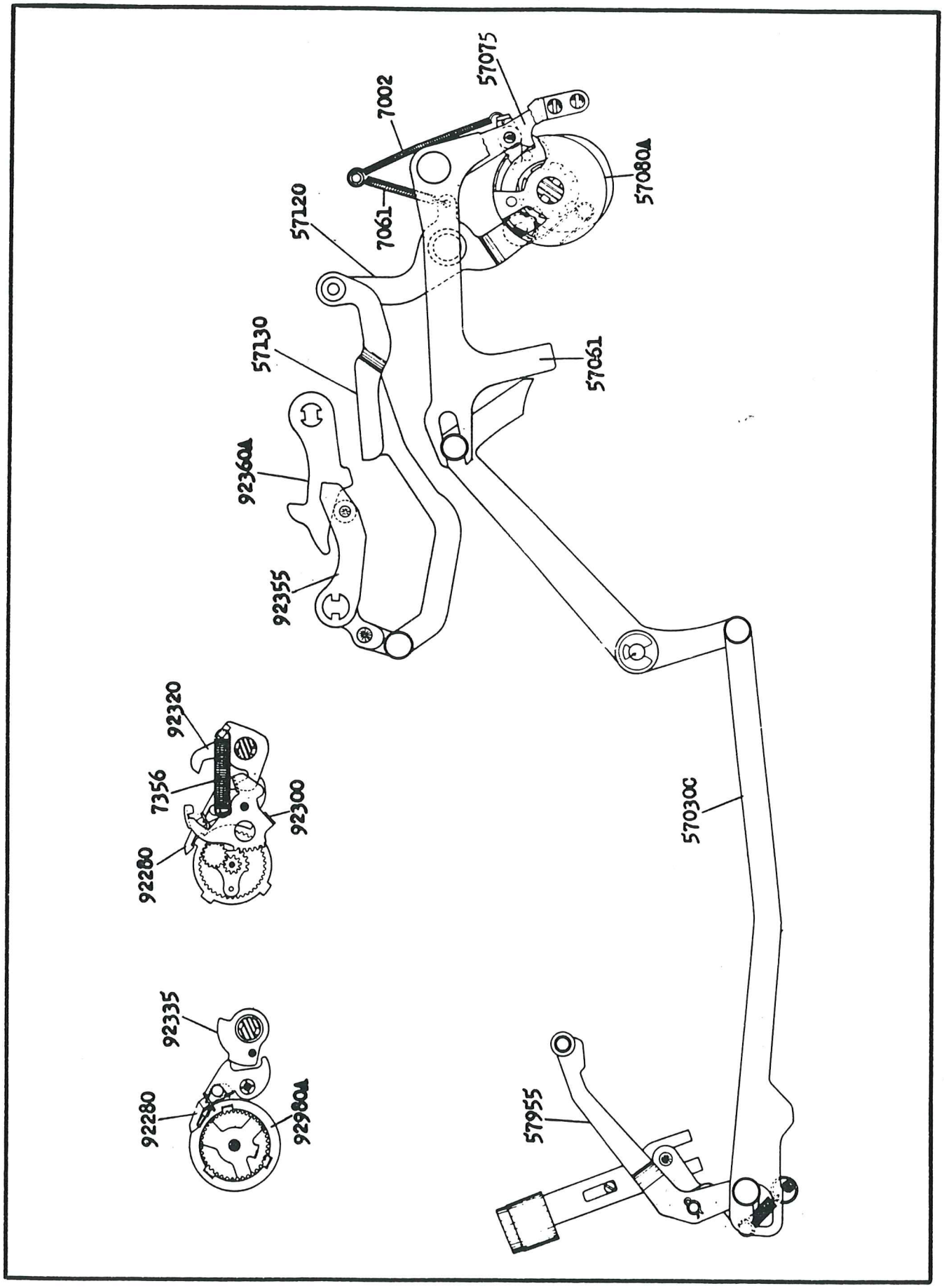


ACCUMULATOR & COUNTER CARRIAGE

READABLE COUNTER MECHANISM



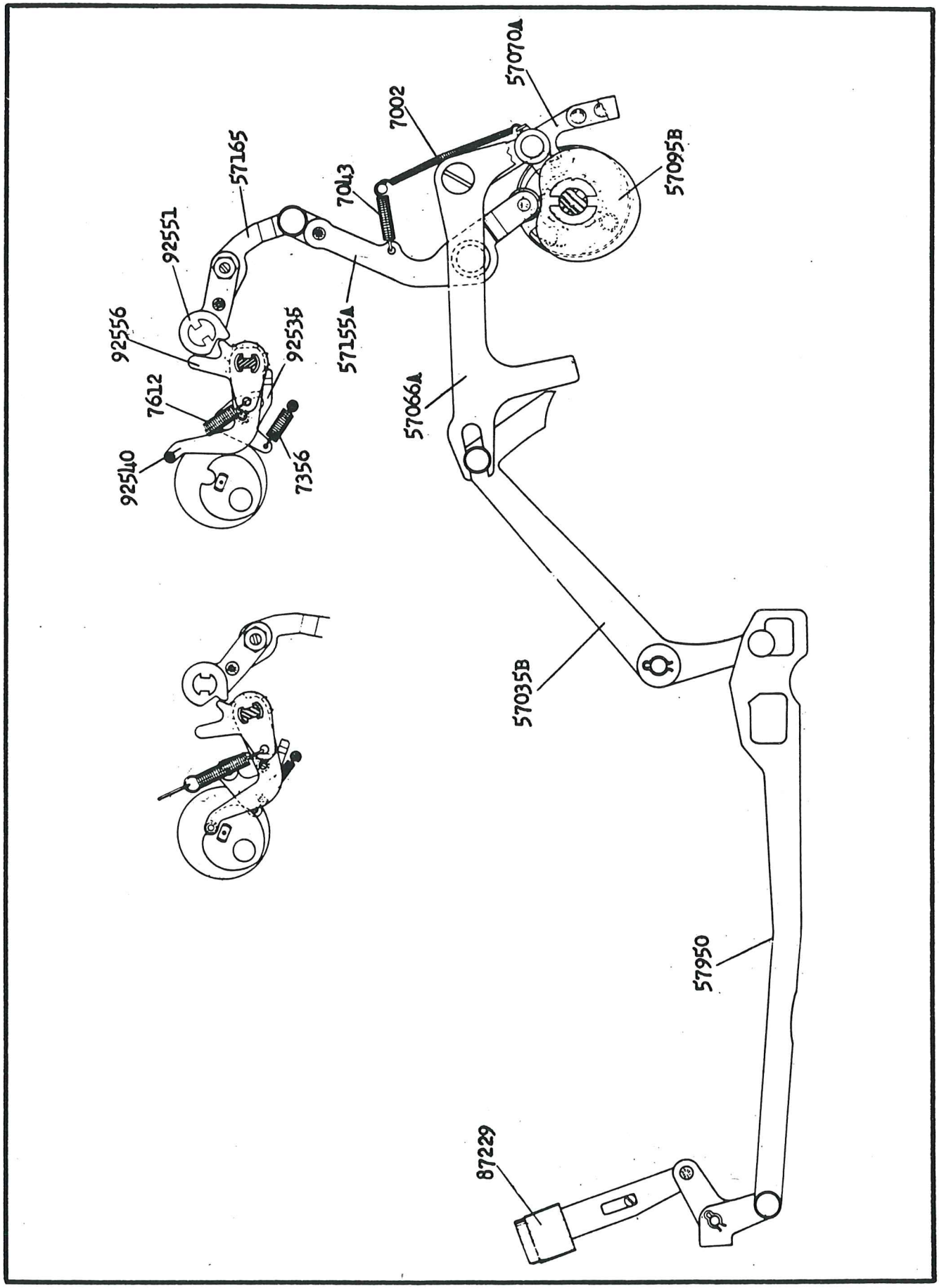
READABLE COUNTER MECHANISM



PRODUCT CLEAR

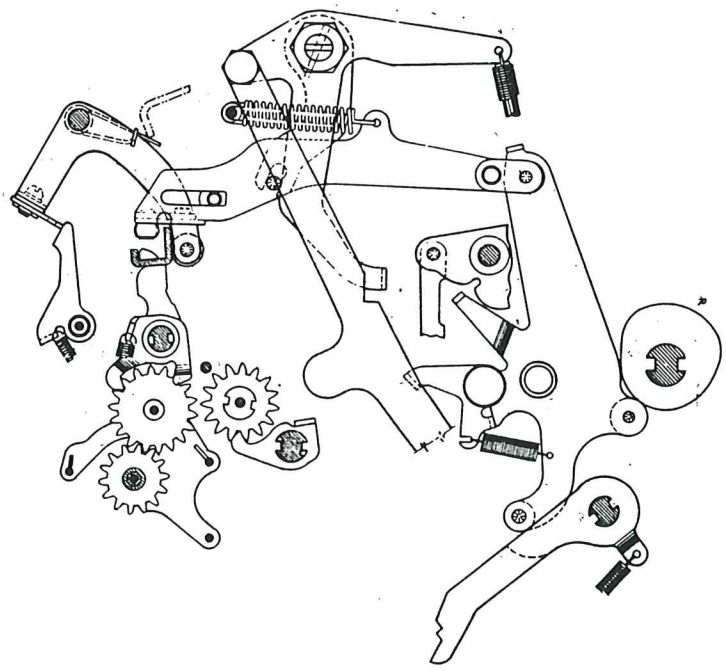
SCM

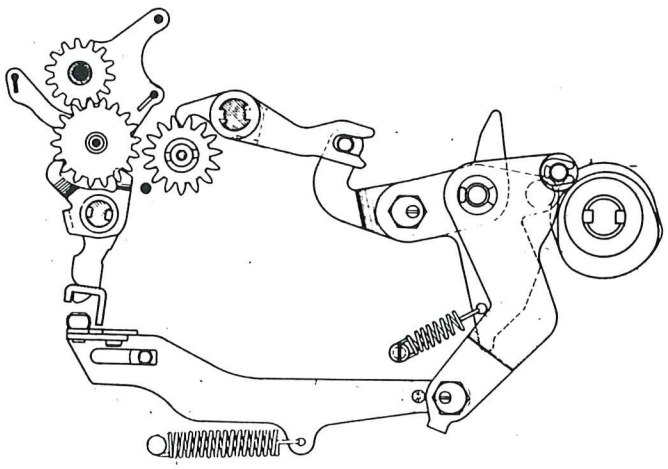
COUNTER CLEAR



COUNTER CLEAR

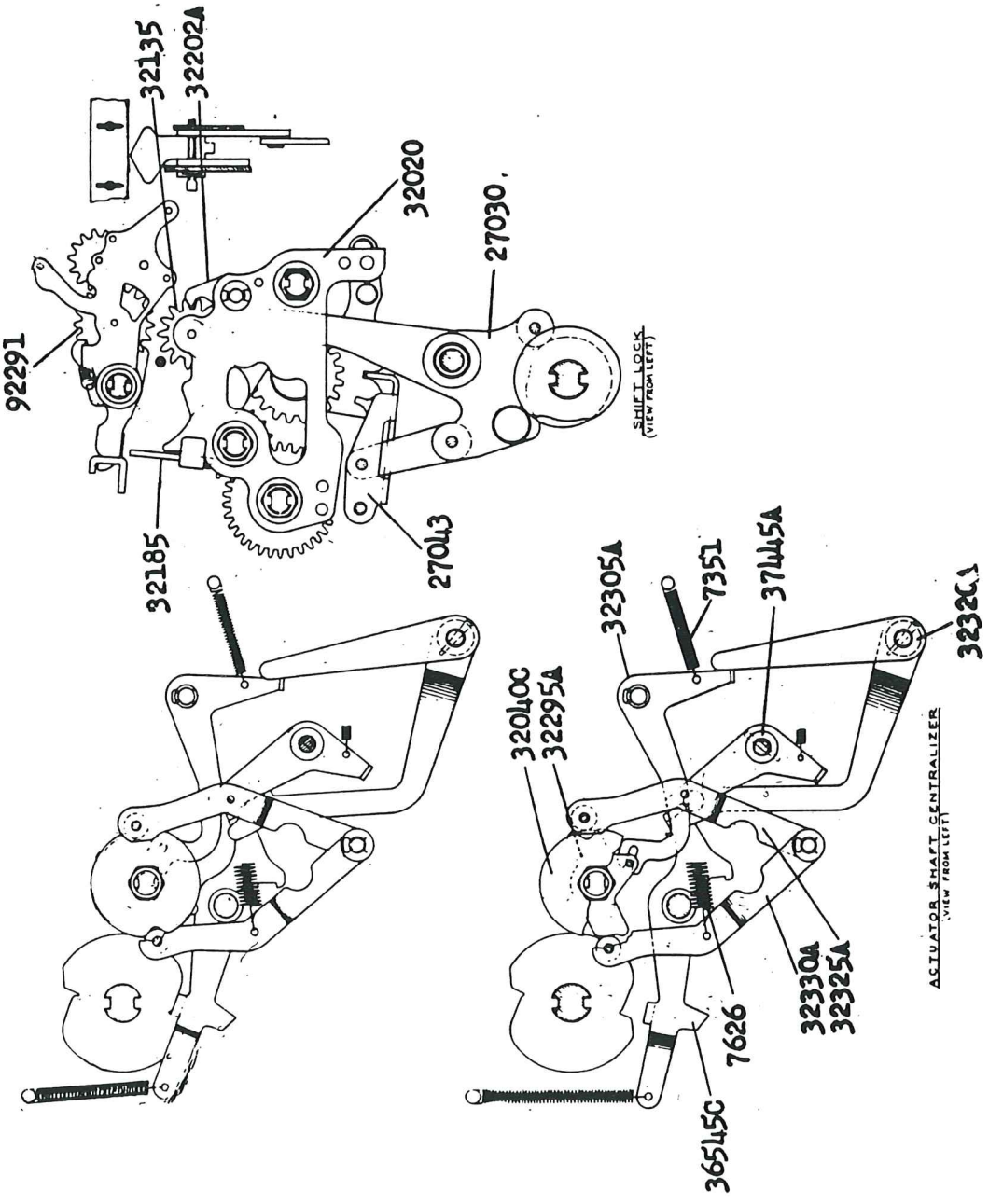
CARRIAGE DIPPING MECHANISM





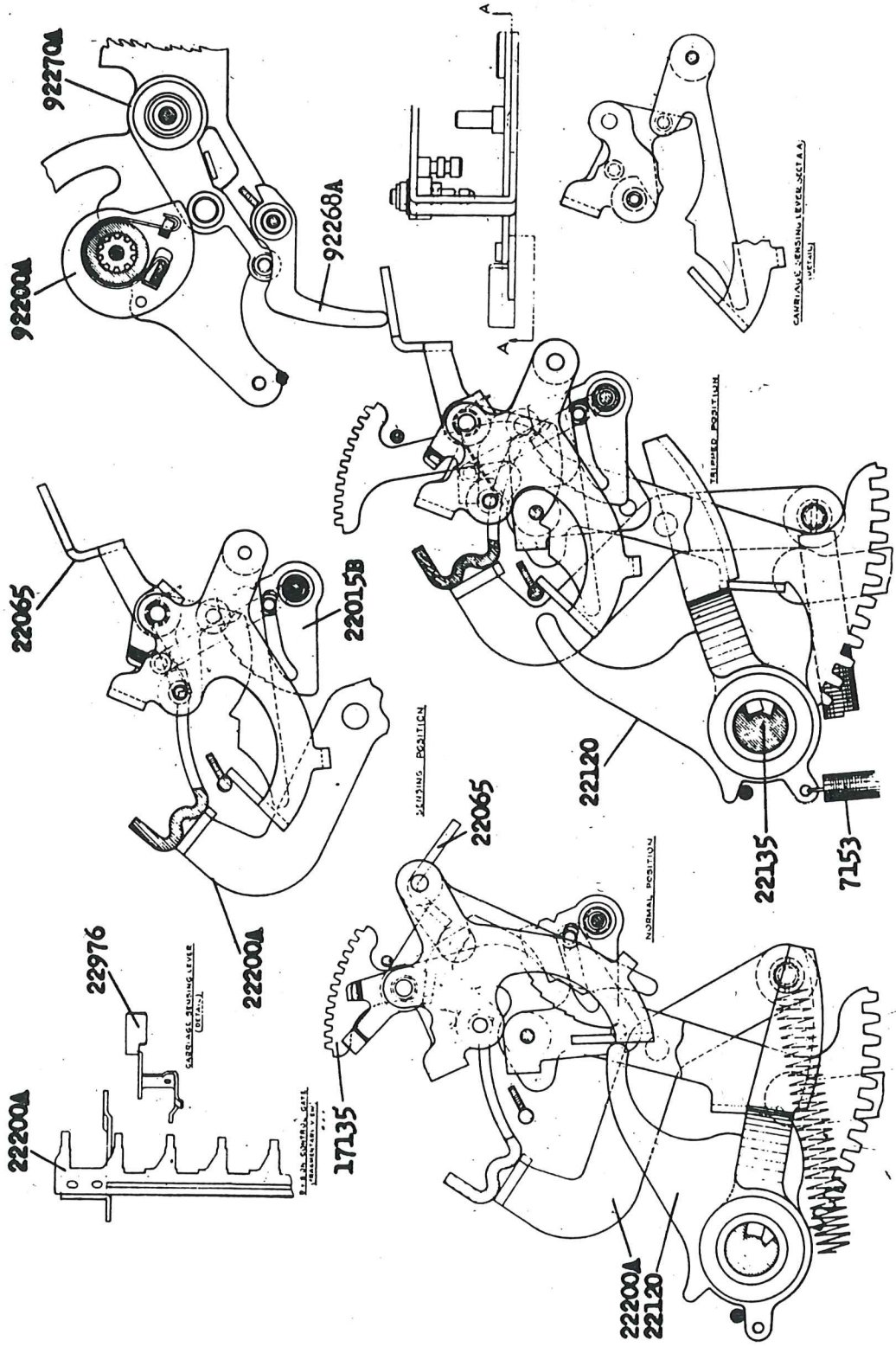
CARRIAGE DIPPING MECHANISM

½ TURN SHAFT CENTRALIZER & SHIFT LOCK



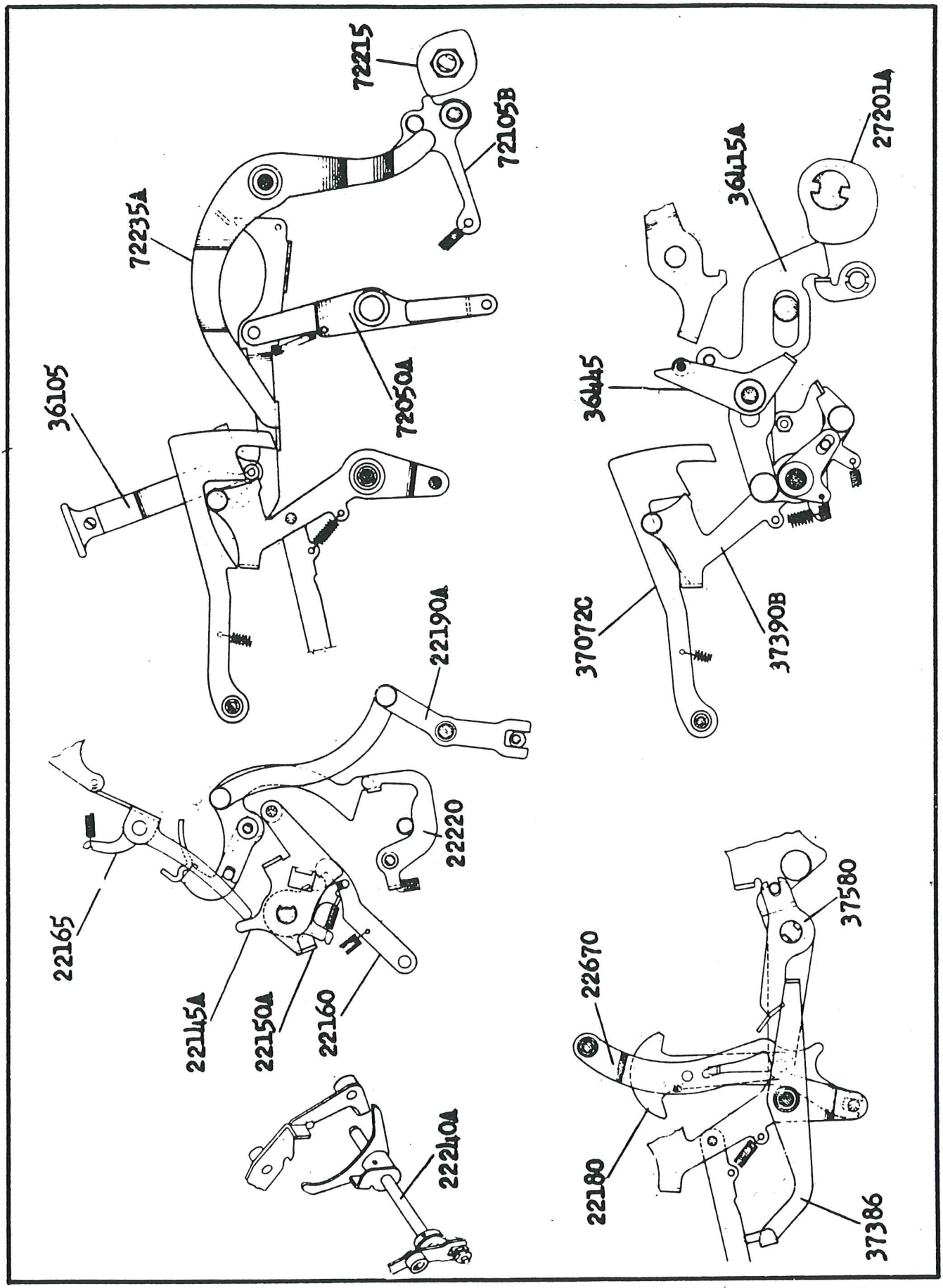
½ TURN SHAFT CENTRALIZER & SHIFT LOCK

DIVISION SENSING MECHANISM



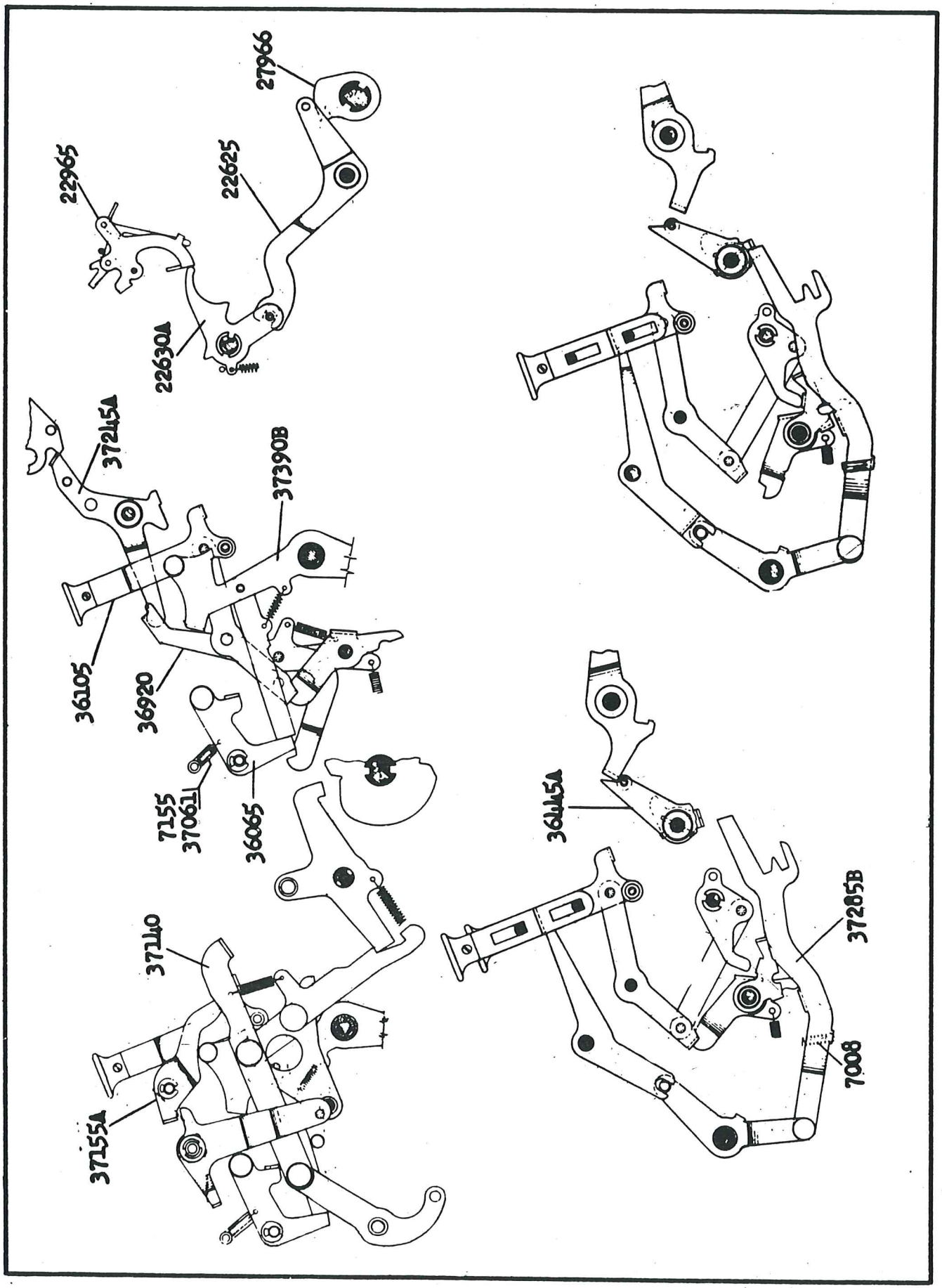
DIVISION SENSING MECHANISM

DIVISION CONTROL



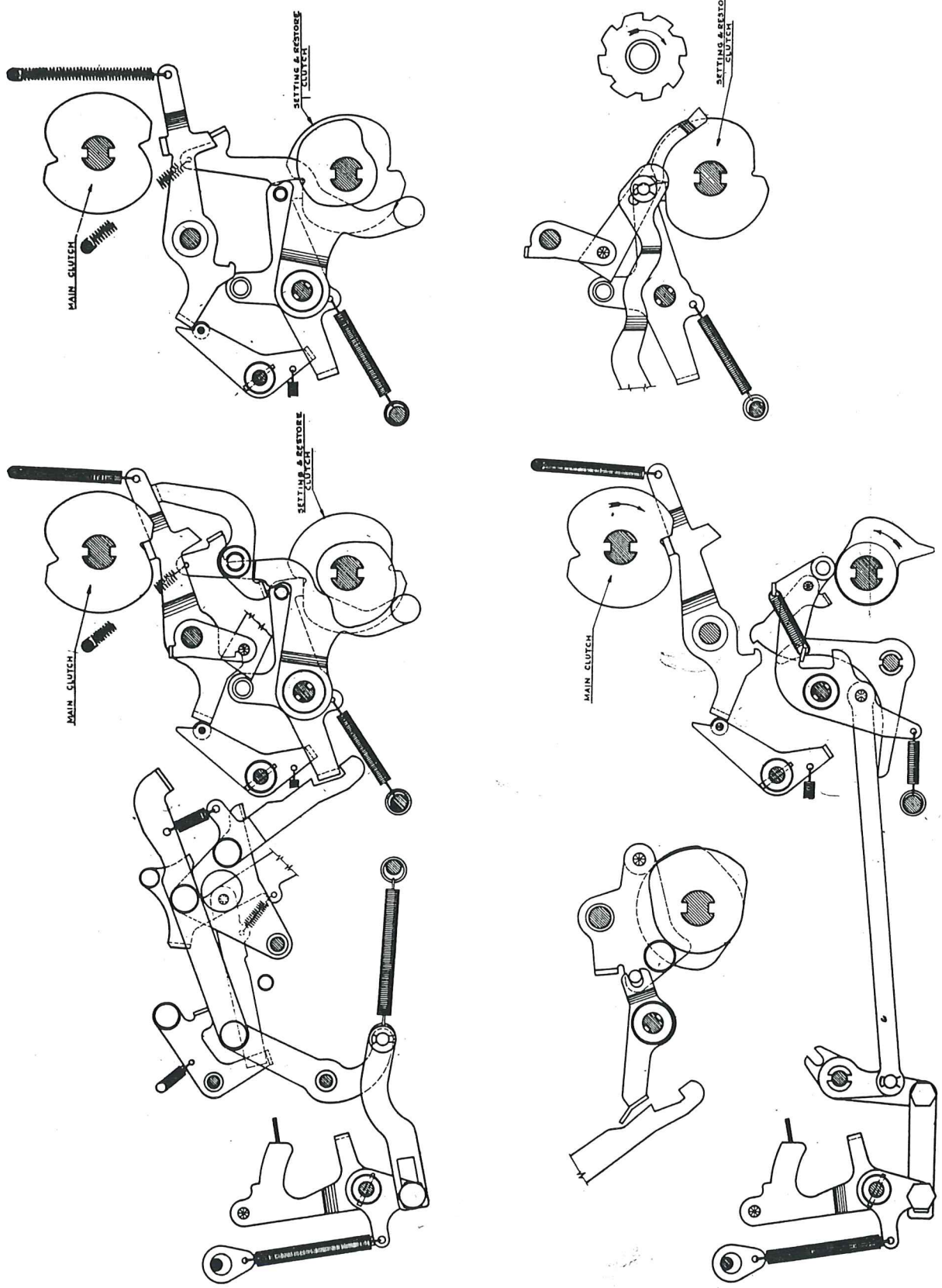
DIVISION CONTROL

DIVISION CONTROL MECHANISM



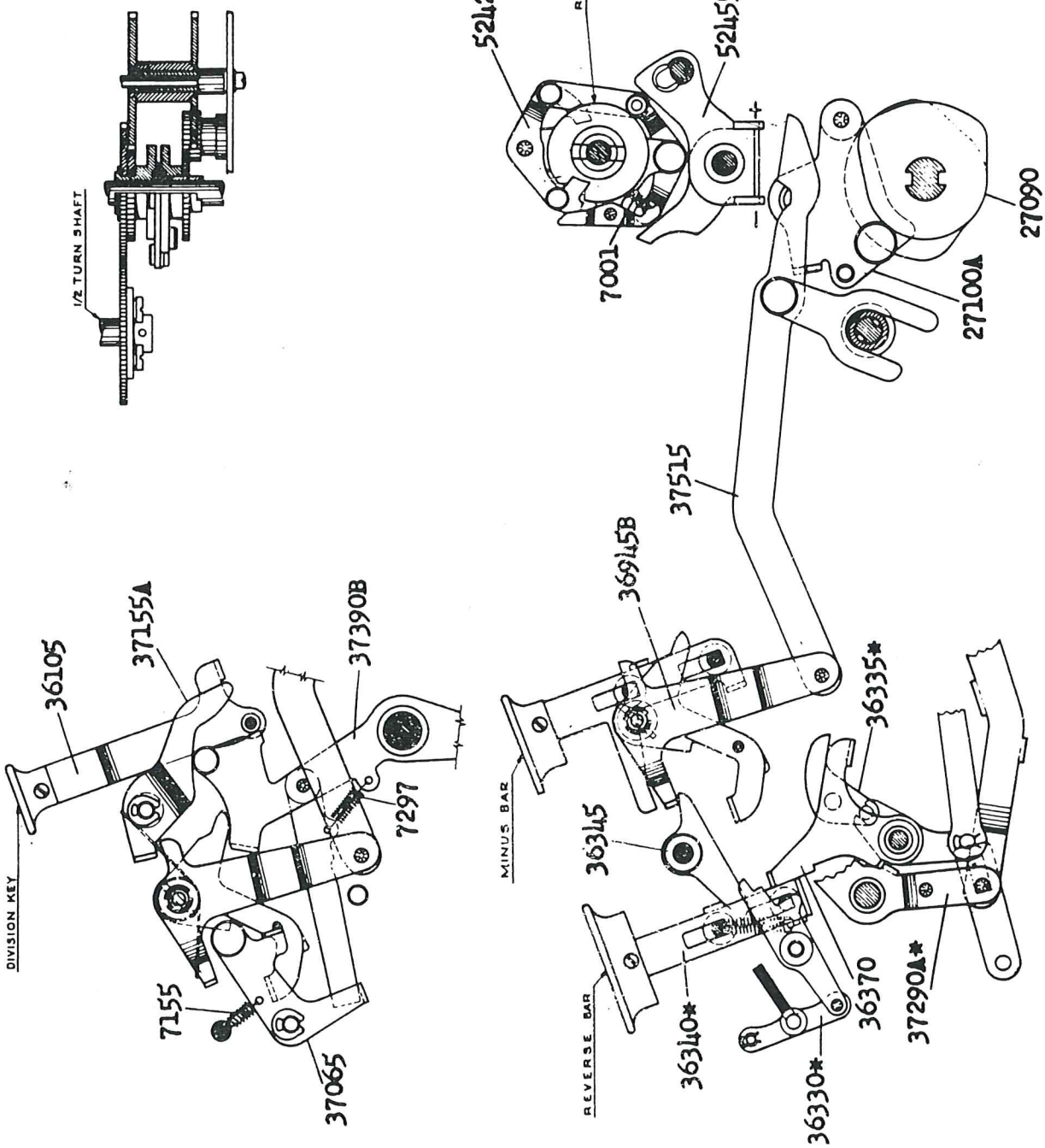
DIVISION CONTROL MECHANISM

SETTING & MAIN CLUTCH CONTROL



SETTING & MAIN CLUTCH CONTROL

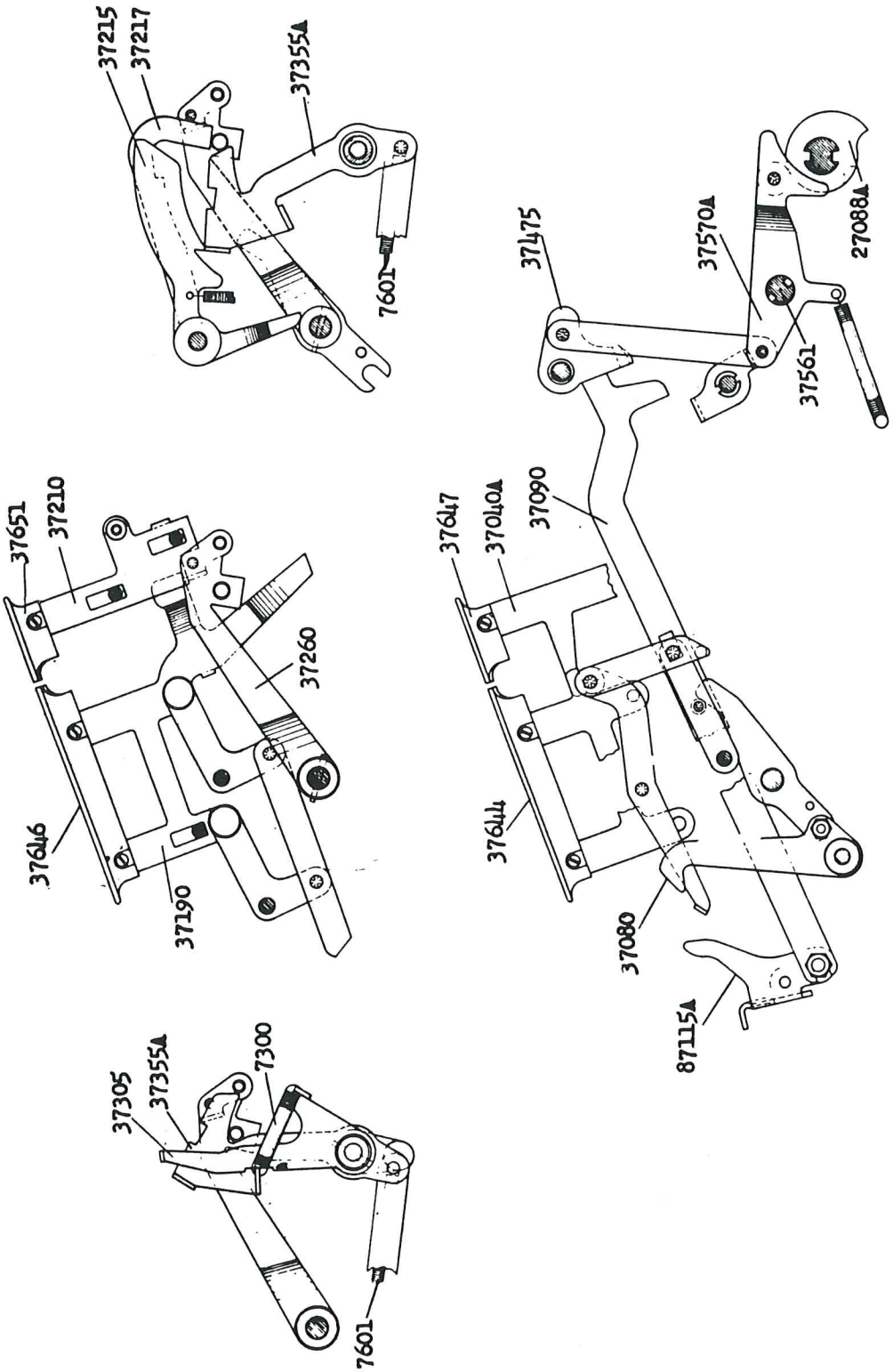
REVERSE CLUTCH CONTROL



REVERSE CLUTCH CONTROL

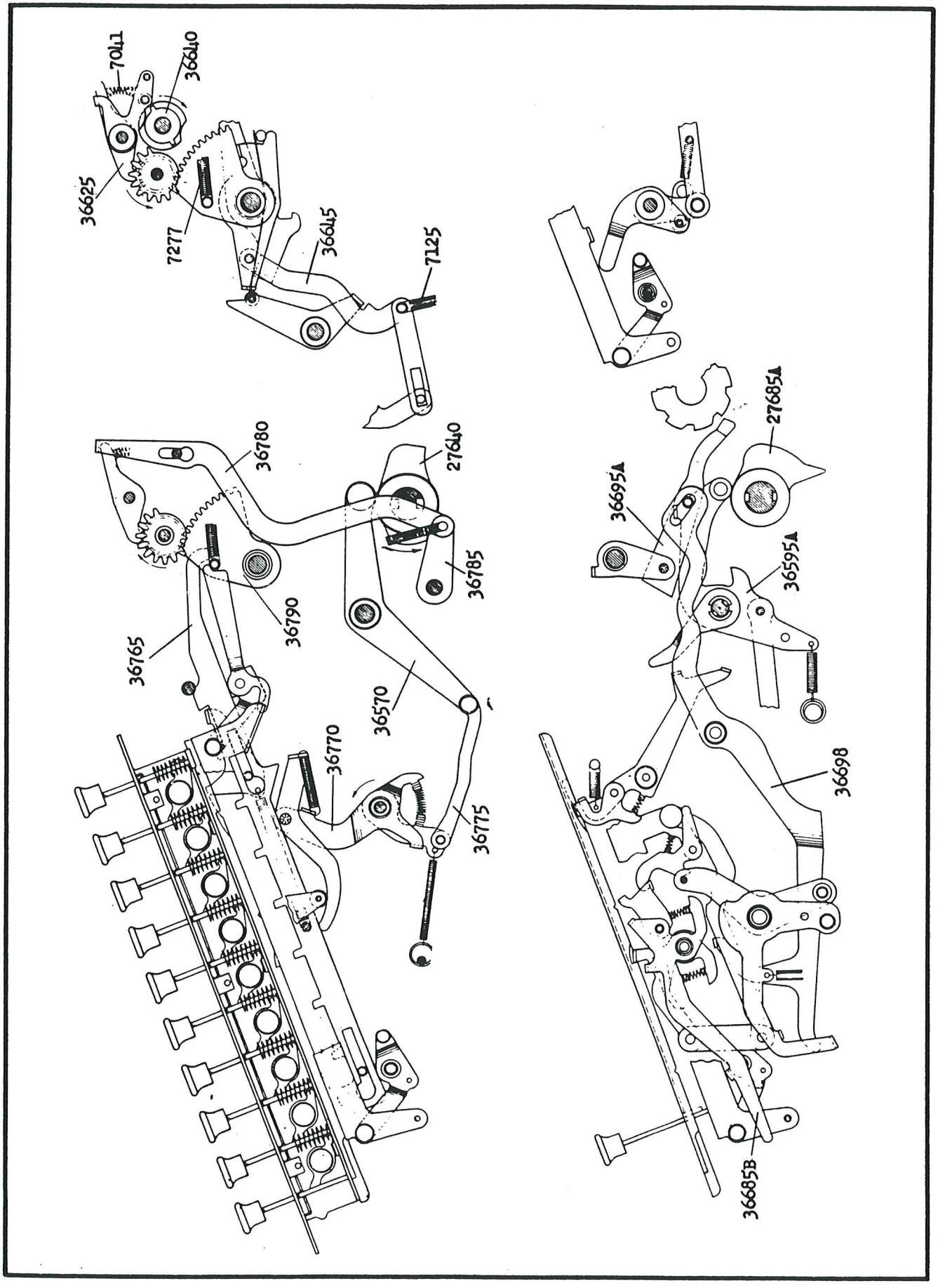
SCM

CONTROL UNIT "D" MODELS



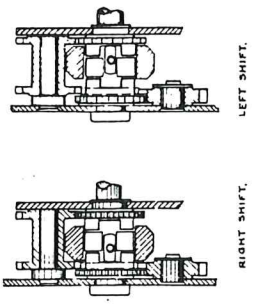
CONTROL UNIT "D" MODELS

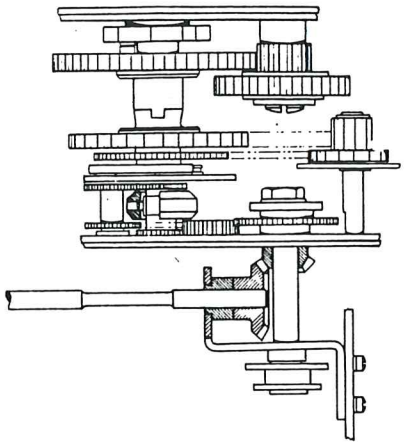
MULTIPLIER UNIT

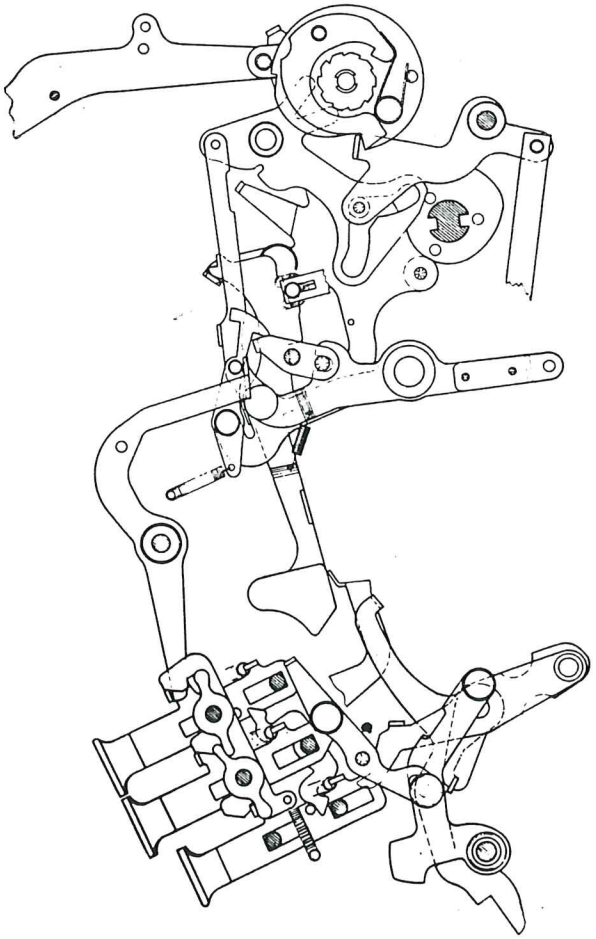


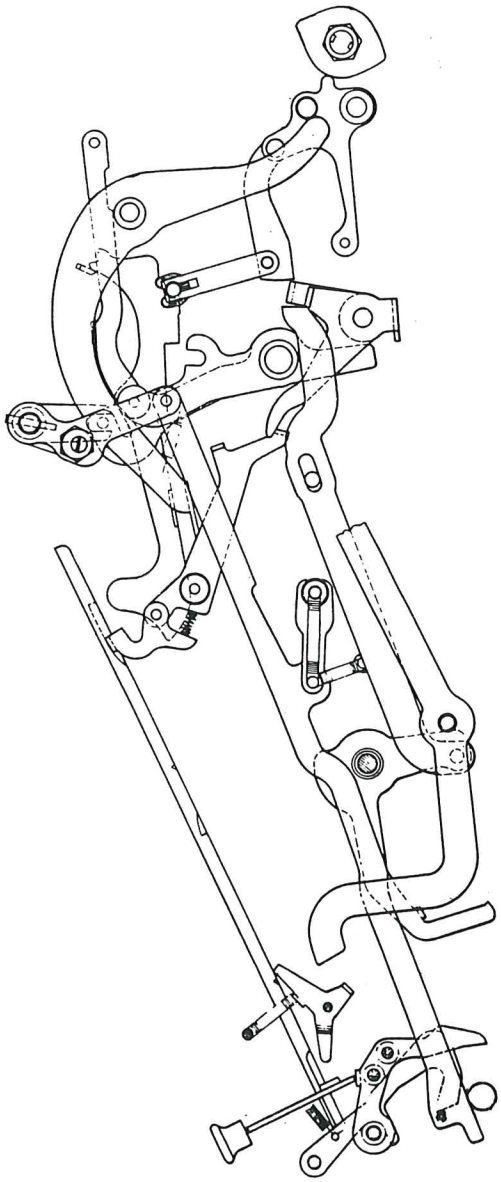
MULTIPLIER UNIT

AUTO SHIFT & ZERO SHIFT CONTROLS (SILENT SPEED)



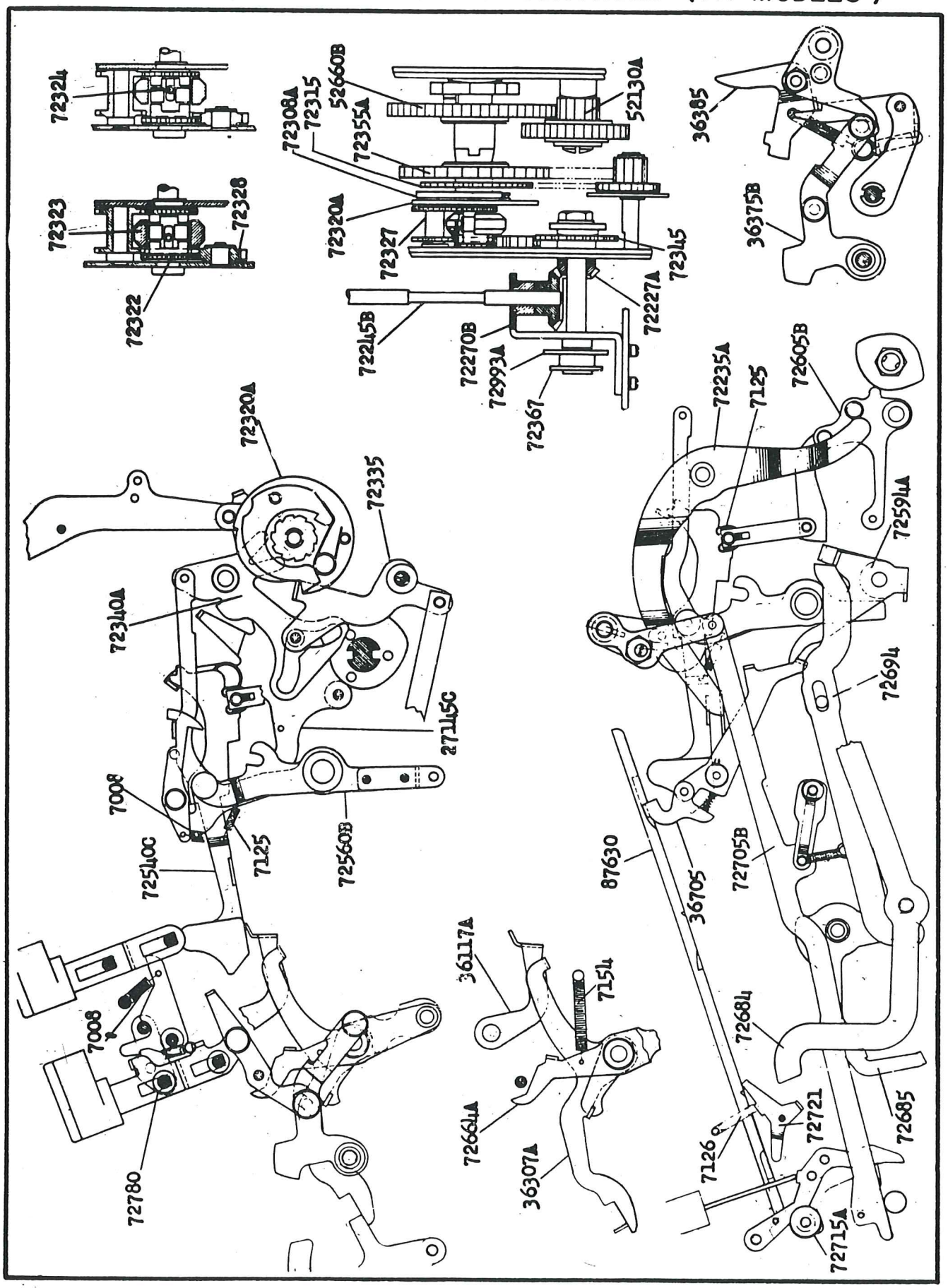






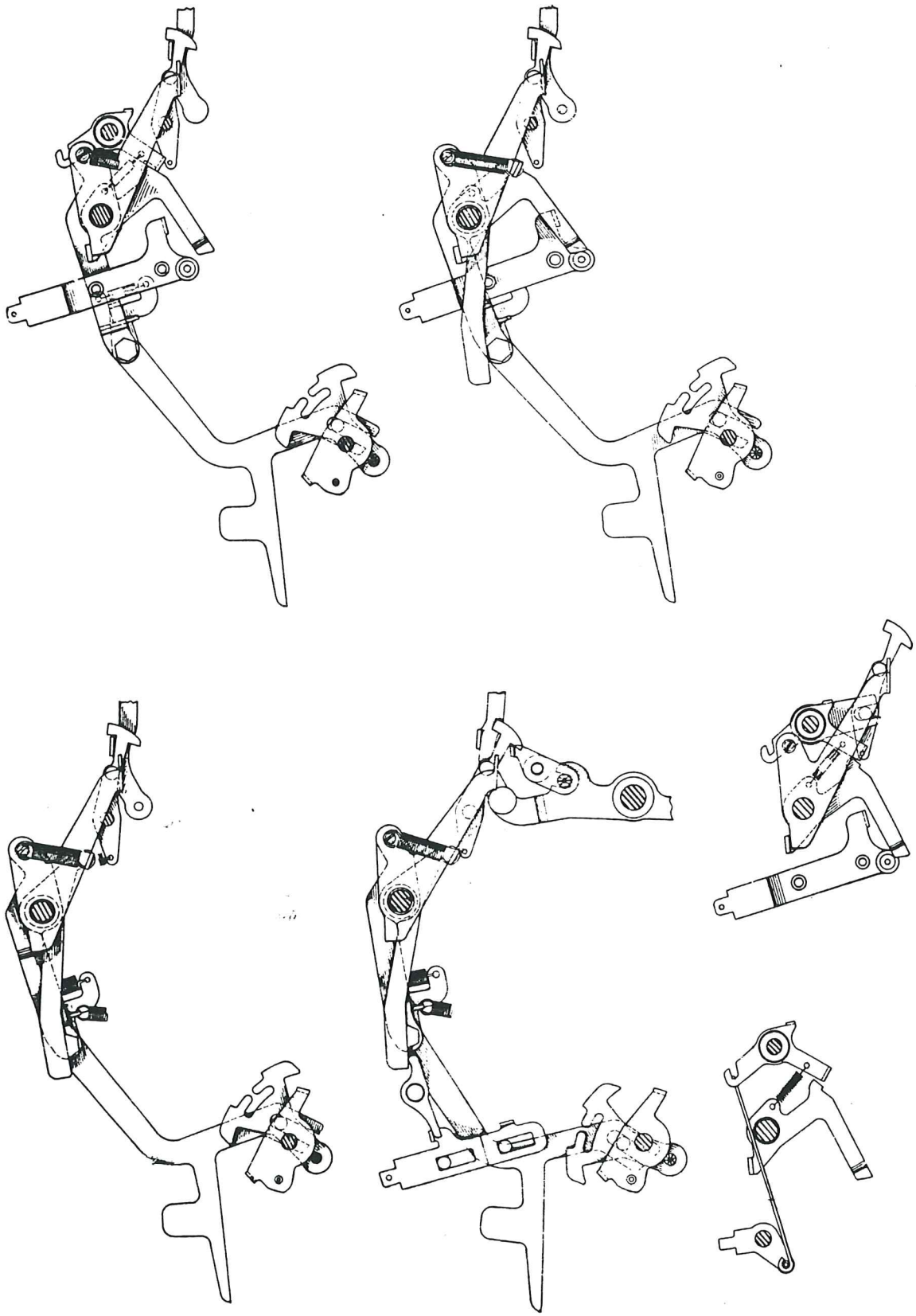
AUTO SHIFT & ZERO SHIFT CONTROLS (SILENT SPEED)

AUTO SHIFT & ZERO SHIFT CONTROLS (FA MODELS)



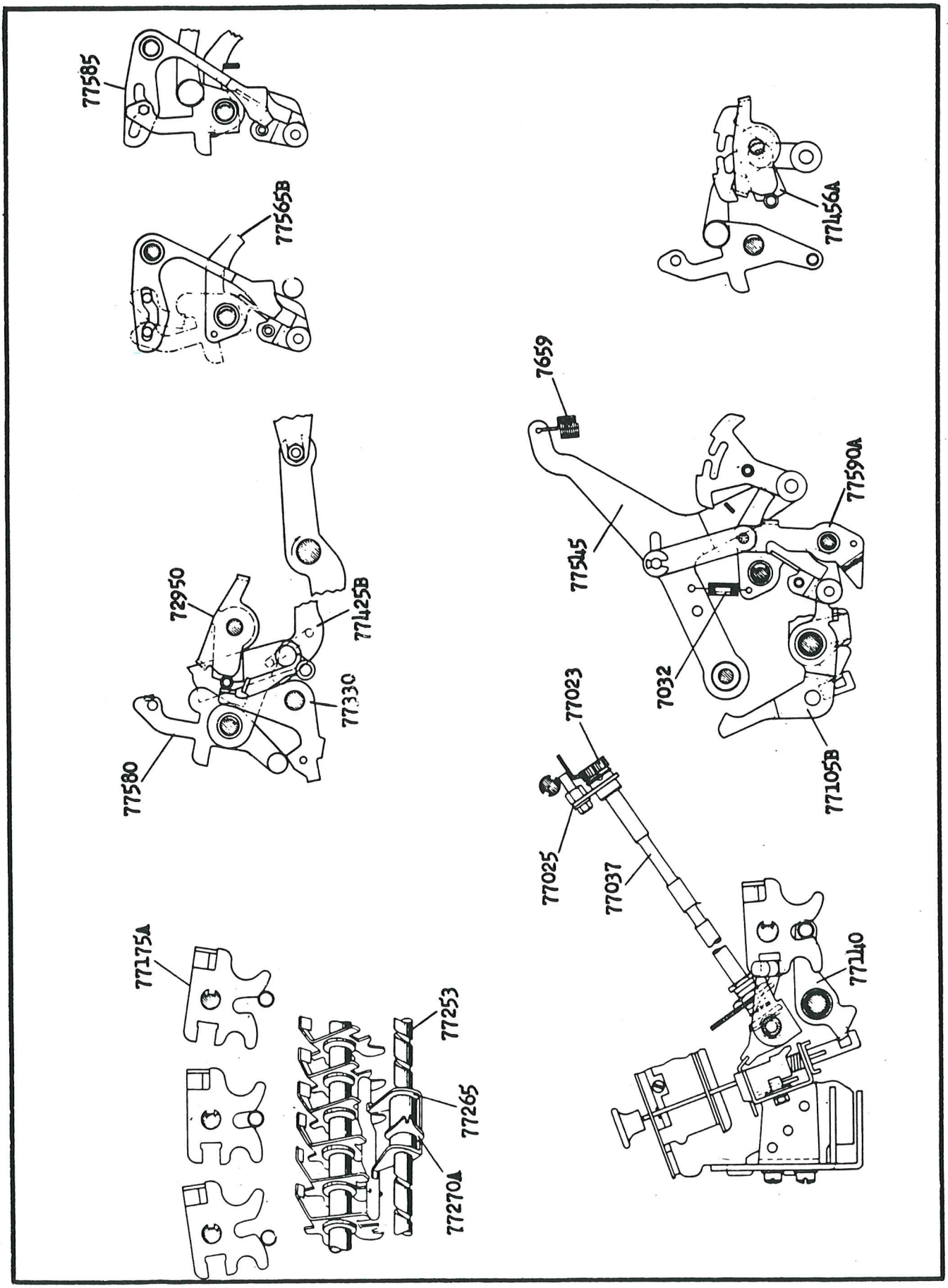
AUTO SHIFT & ZERO SHIFT CONTROLS (FA MODELS)

NORMAL LEFT SHIFT (SILENT SPEED)



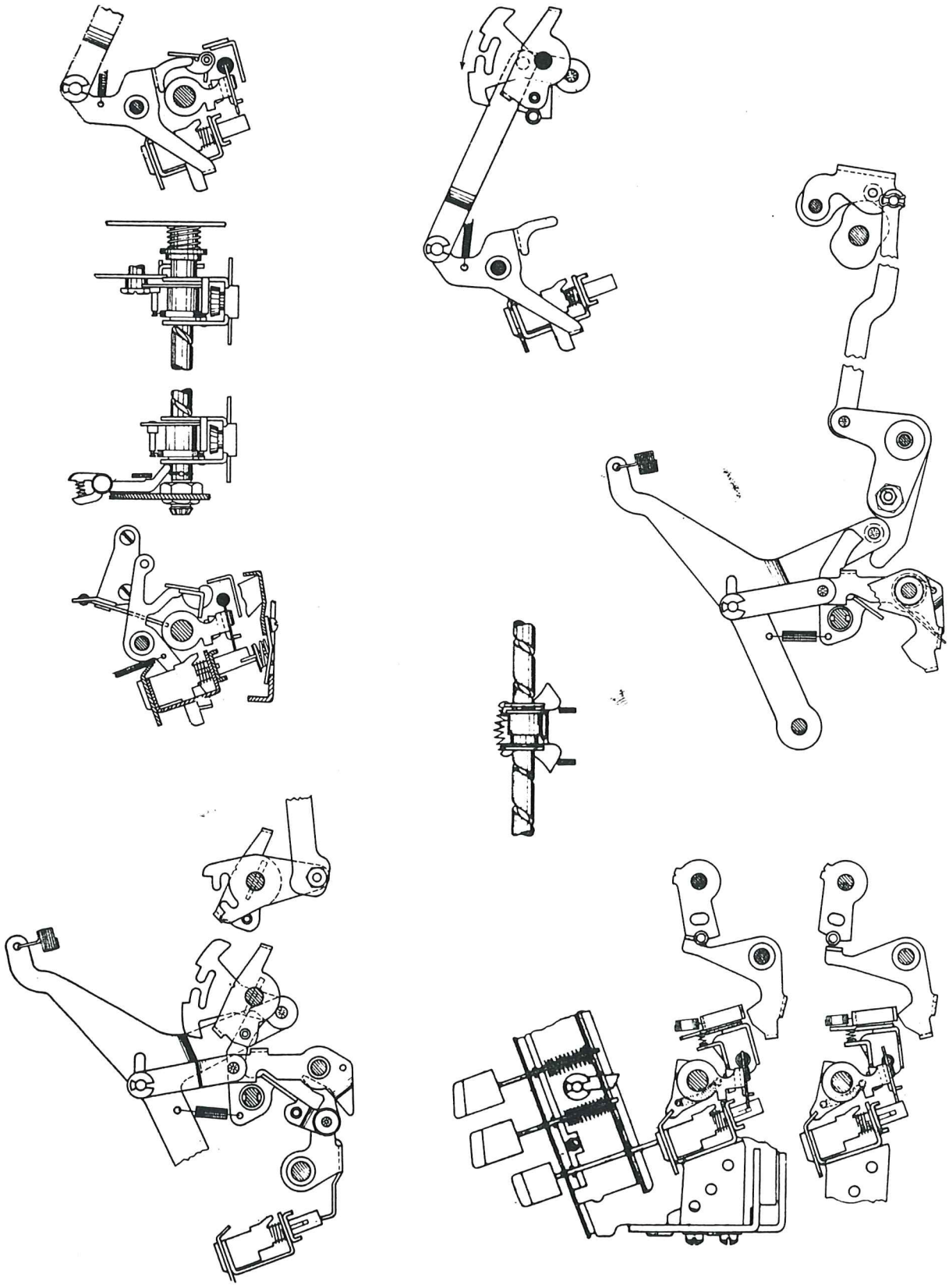
NORMAL LEFT SHIFT SILENT SPEED)

TABULATOR MECHANISM (SILENT SPEED)



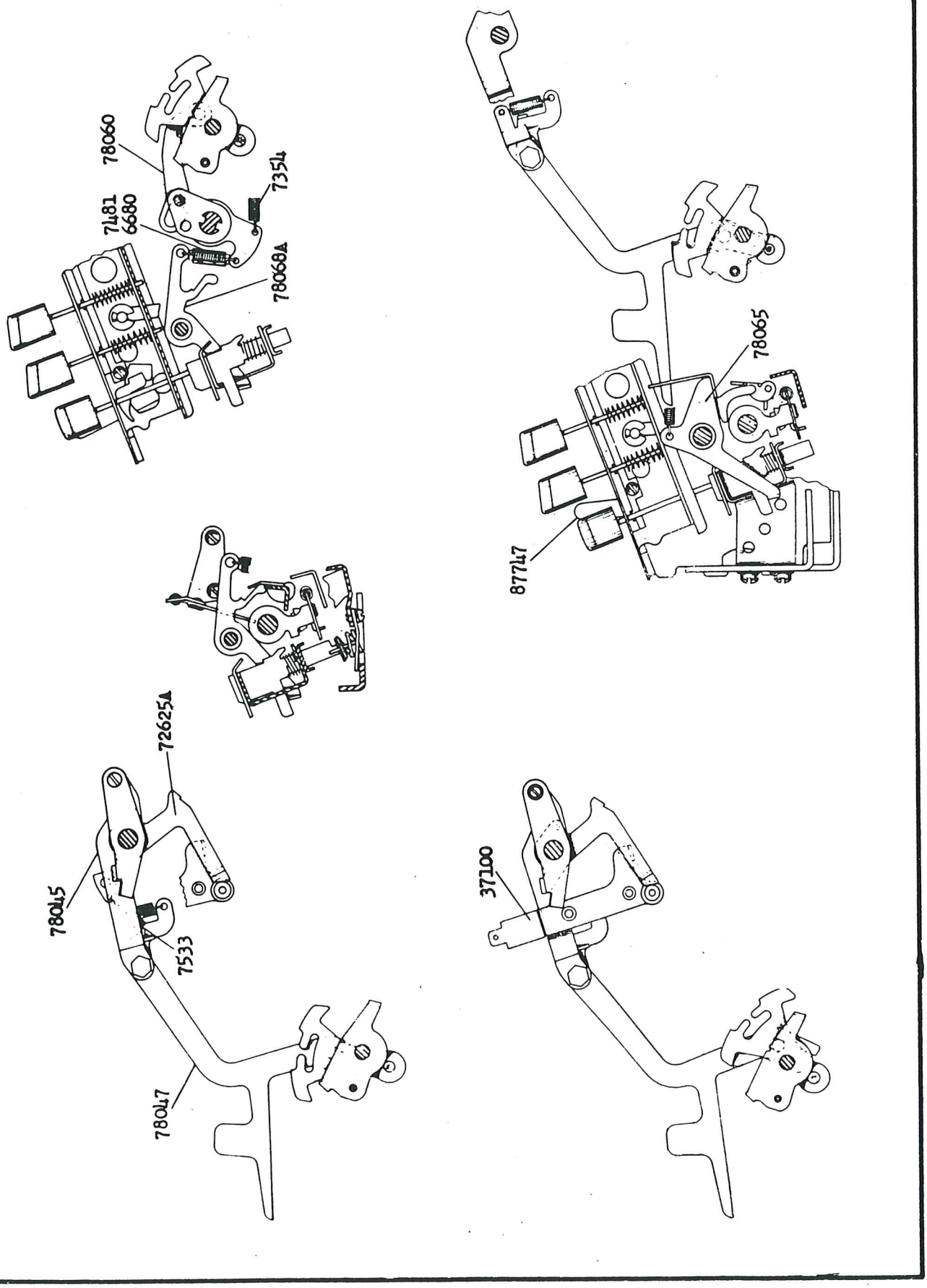
TABULATOR MECHANISM (SILENT SPEED)

UNIVERSAL TABULATOR (FA MODELS)



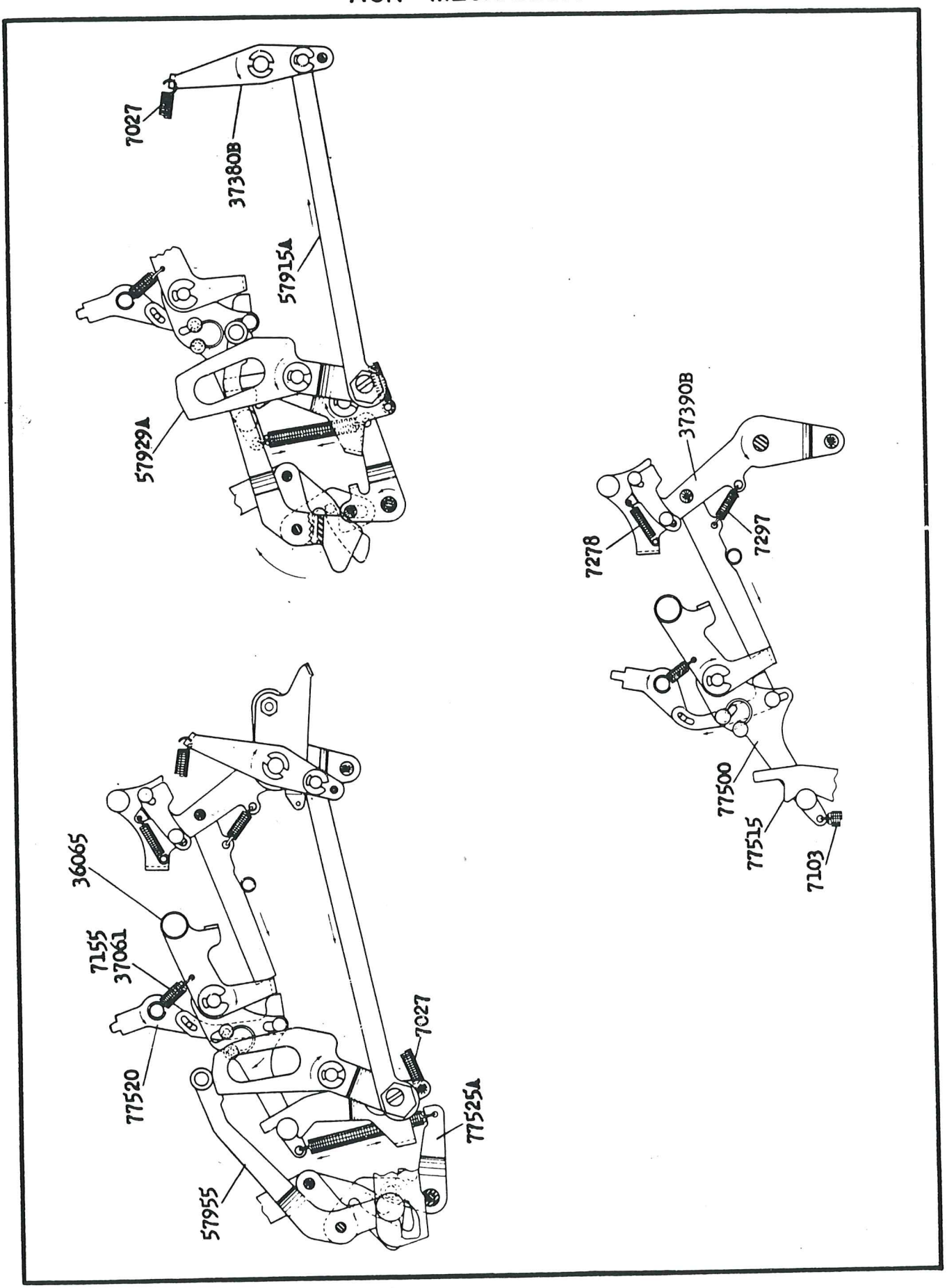
UNIVERSAL TABULATOR (FA MODELS)

UNIVERSAL TABULATOR (SD MODELS)



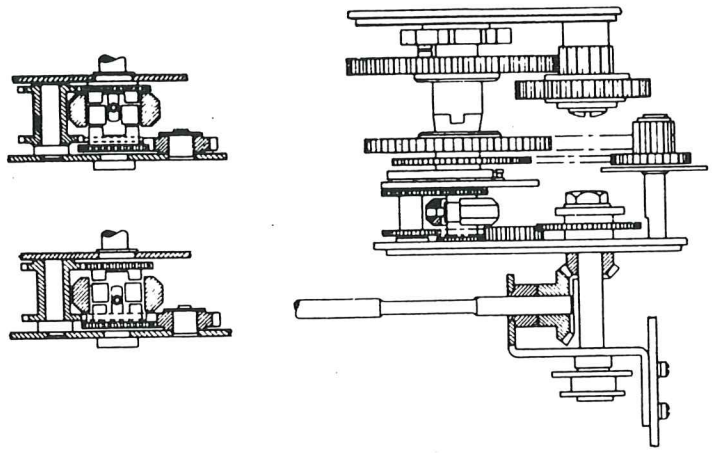
UNIVERSAL TABULATOR (SD MODELS)

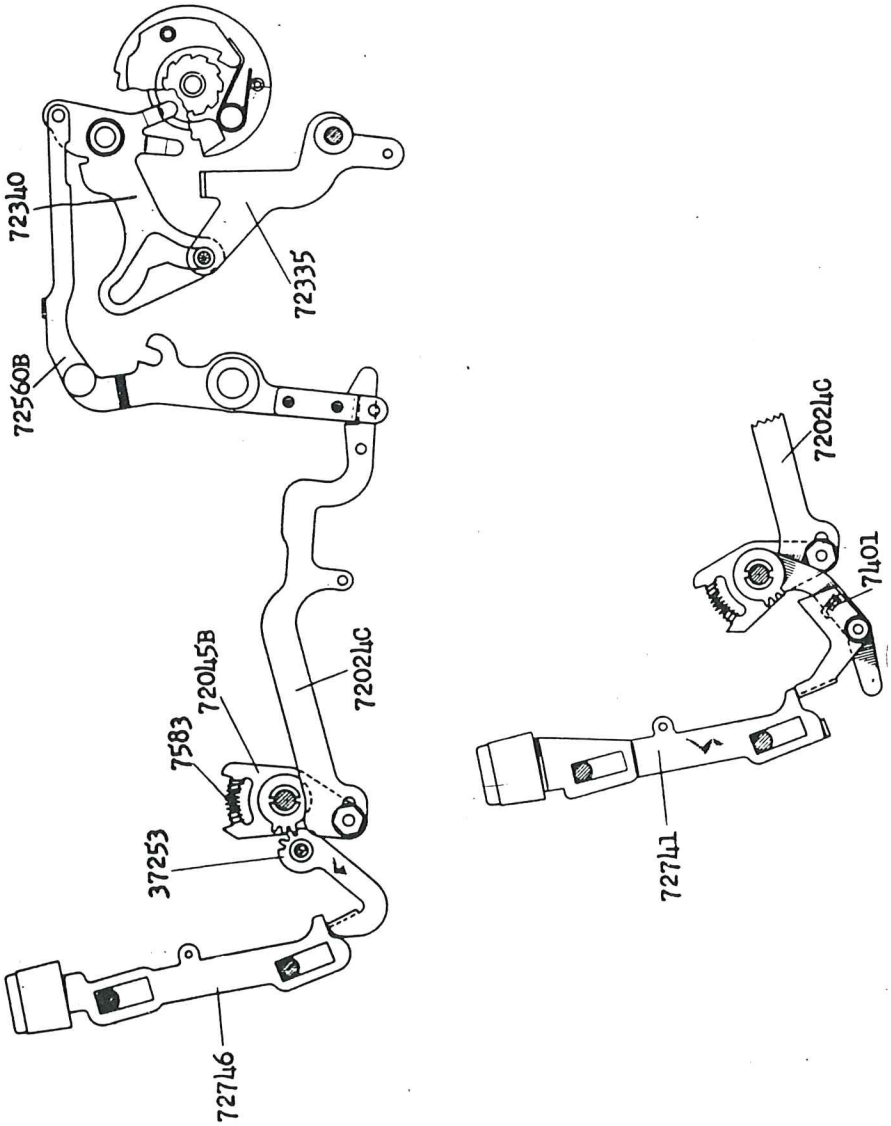
ACR MECHANISM



ACR MECHANISM

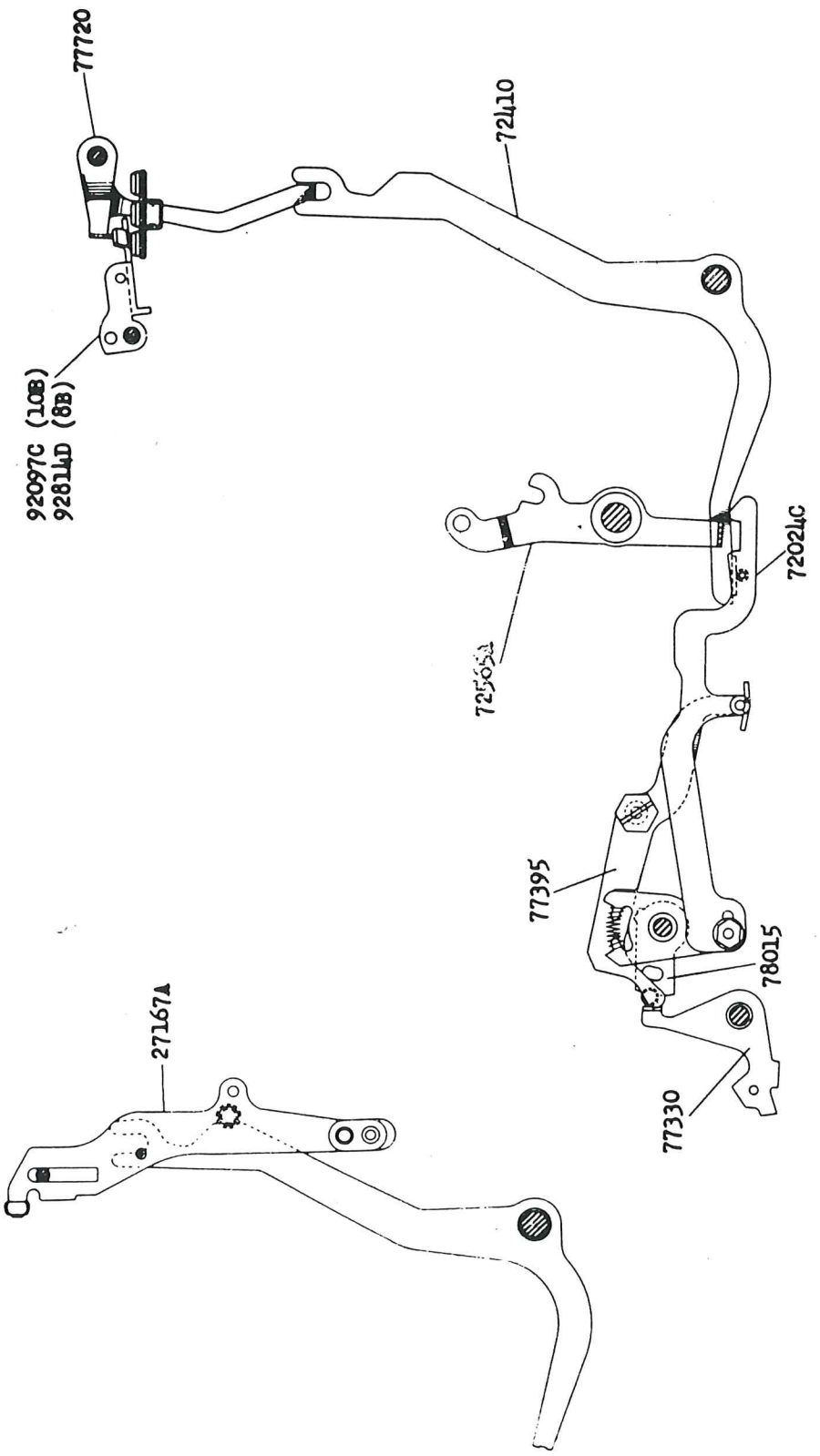
RELOCATED SHIFT KEYS



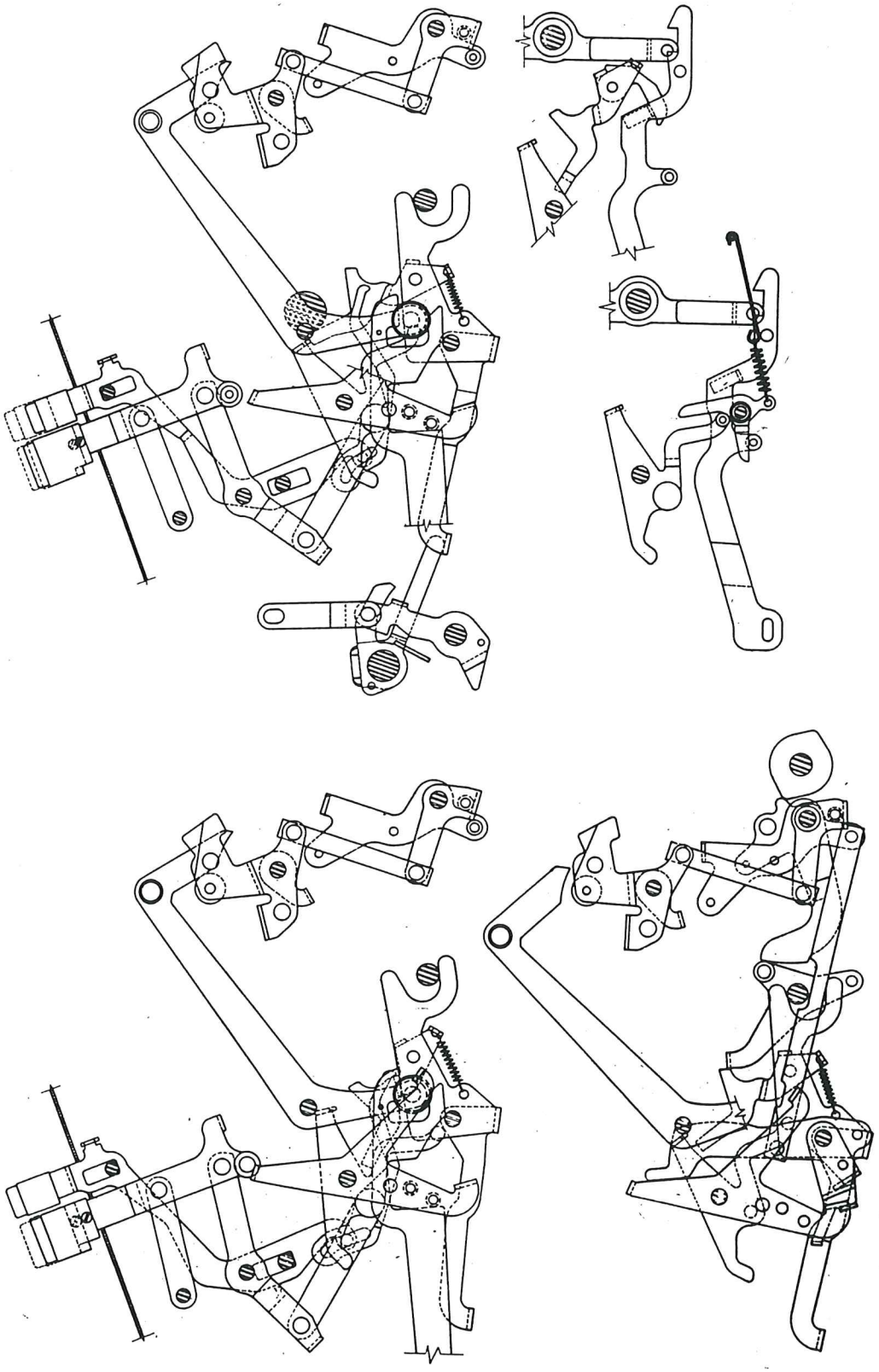


RELOCATED SHIFT KEYS

SHIFT TERMINATING MECHANISM



SHIFT TERMINAT G MECHANISM



AUTOMATIC DIVISION LINEUP

DEPRESS DIVISION KEY:

POSITIONS COUNTER MECHANISM
DISABLES MANUAL SHIFT
37390 ROCKS TO REAR -
ROCKS 37155 TO POSITION REVERSE CLUTCH MECHANISM TO NEGATIVE;
DISABLES AUTOMATIC SHIFT
POSITIONS 22180 FORWARD
TRIPS SETTING CLUTCH.

SETTING LINE REVOLVES:

SELECTION SHAFT 17046 MOVES FORWARD AND DELAY LATCH 22220 RISES IN PATH OF 22190;
22180 DEPRESSES 22150 TO RELEASE GATE 22200, WITHDRAW 22120'S FROM SENSING LEVERS 22065, AND 22165 TO LOCK CARRIAGE.
SELECTION SHAFT 17045 MOVES REARWARD, RELEASING DELAY LATCH 22220 FROM 22190 THUS ALLOWING DIVISION GATE 22200 TO LIMIT AGAINST THE TAIL OF THE SENSING LEVER OF THE CONTROL ORDER.

MAIN CLUTCH IS RELEASED:

PRODUCT DIAL REVOLVES;
92270 DEPRESSES SENSING LEVER SHELF AND RELEASES DIVISION GATE 22200 WHICH ROCKS 22240 TO THE REAR.
FRONT ARM OF 22240 RELEASES LATCH FROM MAIN CLUTCH DOG 37540.

RESTORE STROKE:

37415 RECOCKS DIVISION GATE 22200 AND HATCHET 37390 WHICH IS LATCHED BY THE 37072.
HATCHET 37390 ALSO ROCKS 37155 TO POSITION REVERSE CLUTCH TO POSITIVE AND 22180 TO THE REAR OVER THE 22155. 37403 ROCKS 37065 TO DEPRESS OPERATING BAR 37141 AND START PLUS STROKE.
DIALS BEING AT "0", THE ROLLER ARMS 92270 LIMIT ON HIGH POINTS OF SNAIL CAMS OF DIALS. THEREFORE THE 92270'S DEPRESS THE SENSING LEVERS ENOUGH TO DISENGAGE THEM FROM THE DIVISION GATE 22200.
GATE 22200 TRIPS REARWARD AGAIN AND THE FRONT ARM OF THE 22240 DISENGAGES THE LATCH OF THE 37445 FROM THE MAIN CLUTCH DOG. THE REAR ARM OF THE 22240 DISABLES THE LATCH ON THE 37595 TO PREVENT ENGAGEMENT WITH THE MAIN CLUTCH DOG AND BLOCKS A MAIN CLUTCH CYCLE.

PLUS STROKE:

SETTING LINE REVOLVES BUT MAIN CLUTCH DOES NOT. 22180 is PULLED DOWN AND ROCKS 22155 WHICH WITHDRAWS 22165 FROM THE CARRIAGE BRACES AND ALSO DIPS THE SENSING LEVERS.
22160 LATCHES THE 22155.
22035 RECOCKS THE DIVISION GATE.
37402 IS LIFTED FROM 36065 THUS LIMITING MACHINE TO ONE PLUS STROKE.

RESTORE STROKE:

CARRIAGE RISES, AND 27145 CONTACTS END OF 72050 STARTING SHIFT, SHIFT RELEASE ROCKS 72235 WHICH RAISES LATCH 37072 TO RELEASE HATCHET 37390 AND RESTART DIVISION.

DIVISION CYCLE:

AN OVERDRAFT AT ONCE OCCURS:
DIVISION GATE 22200 IS RELEASED, WHICH ROCKS 22240 TO WITHDRAW LATCH 37445 FROM MAIN CLUTCH DOG.

RESTORE STROKE:

37415 RECOCKS DIVISION GATE 22200 AND HATCHET 37390 WHICH IS LATCHED BY 37072;
37402 ENGAGES 37065 TO START PLUS STROKE;
22180 ROCKS TO REAR OVER 22155;
DIALS BEING AT "9" TO LEFT OF THE "8" IN THE CONTROL ORDER DIAL. THE ROLLER ARMS 92270 ARE NOT DEPRESSED BY THE DIAL SNAIL CAMS AND THE DIVISION GATE IS HELD BY THE LEFT SENSING LEVER LONG ENOUGH TO PREVENT ITS RELEASING AND DISABLING THE LATCH ON THE 37595. THEREFORE, A TRUE PLUS STROKE WILL FOLLOW AND THE MAIN CLUTCH WILL REVOLVE.

PLUS STROKE:

SETTING LINE REVOLVES AND ALSO THE MAIN CLUTCH.
22180 IS PULLED DOWN AND ROCKS 22155 WHICH WITHDRAWS 22165 FROM THE CARRIAGE BRACES AND ALSO DIPS THE SENSING LEVERS.
22160 LATCHES THE 22155.
22035 RECOCKS THE DIVISION GATE 22200.
37402 IS LIFTED FROM THE 37065 THUS LIMITING THE MACHINE TO ONE PLUS STROKE.

RESTORE STROKE:

CARRIAGE RISES, AND 27145 CONTACTS END OF 72050 STARTING SHIFT
SHIFT RELEASE ROCKS 72235, WHICH RAISES LATCH 37072 TO RELEASE HATCHET 37390, AND RESTARTS DIVISION CYCLE.

LAST POSITION DIVISION RELEASE:

END PLATE OF CARRIAGE ENGAGES 37245 POSITIONING ARM OF 37315 IN PATH OF 37065.
RESTORE STROKE LATCHES BACK HATCHET 37390.
37402 ENGAGES 37065, AND 37065 ENGAGES 37315 AND UNLATCHES DIVISION KEY.

FUNCTIONS

KEYBOARD ENTRY

DEPRESSION OF NUMERICAL KEY

A. RELEASES ANY PREVIOUS DEPRESSED KEY
B. INTERLOCKS KEY SECTION
C. CAMS 38290 SELECTION BAR REARWARD
    1. ROTATES 17835A SELECTION SEGMENT COUNTER CLOCKWISE
        a. ROTATES 17110 SELECTION CAM
        b. ROTATES 17165B CHECK DIAL

ADD OPERATION

DEPRESSION OF ADD BAR:

A. RELEASES 36070 ADD OPERATING ASSEMBLY
    1. SETS MINUS INTERLOCK 36228
    2. POSITIONS NON SHIFT LINKAGE AND BAIL 72664A TO LATCHED POSITION
    3. ROCKS 36140 MAIN OPERATING BAR
        a. INTERLOCKS SHIFT
        b. ROCKS 36580B SETTING CLUTCH RELEASE DOG
            1. ROCKS SWITCH CONTROL LEVER 38090A
                (a) STARTS MOTOR
                (b) INTERLOCKS CLEAR LEVERS
            2. RELEASES SETTING CLUTCH
B. POSITIONS 36067 FOR KEYBOARD CLEAR
C. INTERLOCKS DIVISION KEY

SETTING CLUTCH ROTATION FIRST CYCLE

A. CAM 27035A AND 27140D RELEASE SELECTION LOCK GATE 27043A
B. CAM 27035A CENTRALIZES CARRIAGE
C. CAMS 27020B THROUGH 17100A RELEASES 17055 TO ENGAGE 17110
D. CAMS 27020B ROCK SELECTION FEELER ARMS 17065 TO MAKE SELECTION
    1. 17065 POSITION 32135A
E. CAMS 27035A AND 27140D ROCKS 27043A BACK INTO ENGAGEMENT WITH 32135A LOCKING THE SELECTION
F. PAWLS 17055 RELEASE 17110
G. CAM 27090 POSITION REVERSE CLUTCH 52455 AND RELEASES 36140 FROM 36580B
H. 27185B AND 27140D DIPS CARRIAGE
    1. ROCKS 92320 FROM 92291
    2. SETS SHIFT INTERLOCK ON 27210A
    3. POSITIONS COUNTER MECHANISM FOR POSITIVE COUNT
    4. KEEPS POINTS CLOSED THROUGH 62096B
    5. POSITIONS 72665B TO UNLATCH NON SHIFT MECHANISM
    6. POSITIONS 37585A UNDER 36140 PREVENTING SETTING CLUTCH REOPENING
    7. RELEASES COUNTER CENTRALIZER 67159A
    8. SETS DIVISION INTERLOCK 67088
I. CAM 27033 RETRACTS SHIFT LOCK 32185
J. CAM 27185D RELEASES PAWLS 32202A

K. CAM 27685D ROCKS STARTING ARM 36595B
   1. ROCKS ASSEMBLY 36430A
      a. RELEASES KEYBOARD THROUGH 36067
      b. RECOCKS ADD OPERATING ASSEMBLY 36070
   2. ROCKS MAIN CLUTCH RELEASE DOG 38440
      a. POSITIONS 36576 ON 36580B FOR STARTING RESTORE CYCLE
      b. RELEASES MAIN CLUTCH
      c. LOCKS COUNTER PIN 38062A
         NOTE: ROLLER LATCH IS PREVENTED FROM LATCHING 38440 BY TRIP LEVER 36645A
L. SETTING SHAFT CENTRALIZES

MAIN CLUTCH CYCLE

ROTATES REVERSE CLUTCH 52455 ONE-HALF CYCLE:

A. DRIVES DOUBLE IDLER 52280
   1. DRIVES ACTUATOR TRANSFERRING SELECTION INTO CARRIAGE
   2. DRIVES COUNTER MECHANISM AND IN TURN DRIVES COUNTER DIAL ONE DIGIT
B. ACTUATOR CENTRALIZER ARMS ARE BLOCKED BY 32295A
C. 38440 RELEASES DOG RE-ENGAGES MAIN CLUTCH THUS STOPPING MAIN CLUTCH
   1. ROCKS 32295A FROM ACTUATOR CENTRALIZER ARM THUS CENTRALIZING THE ACTUATOR
   2. RELEASES 36576 ON 36580B
      a. WITHDRAWS 36580B FROM SETTING CLUTCH FOR RESTORE CYCLE
   3. RELEASES COUNTER PIN 38062A

RESTORE; SECOND HALF CYCLE

A. CAM 27085D ROCKS PAWLS 32202A INTO MASH WITH 32135A'S
B. CAMS 27185D AND 27140D RELEASE LOWER CARRIAGE
   1. RELEASE PAWLS 92320 TO ENGAGE 92291
   2. RELEASE COUNTER CENTRALIZER 67159A TO CENTRALIZE COUNTER
   3. WITHDRAW SHIFT INTERLOCK ON 27210A
   4. RELEASE COUNTER REVERSE MECHANISM TO RETURN TO NEGATIVE
   5. RELEASE SWITCH CONTROL LEVER 38090A (38090A is held in operation by Setting Clutch Release Dog 36580B)
   6. RELEASE NON-SHIFT BAIL 72665
   7. WITHDRAWS 37585A FROM UNDER 36140
   8. WITHDRAWS DIVISION INTERLOCK 67088
C. 36580B RE-ENGAGES SETTING CLUTCH
   1. RELEASES SWITCH CONTROL LEVER 38090 THUS OPENING POINTS AND WITHDRAWING CLEAR INTERLOCKS

MULTIPLICATION, FUNCTIONING

I. DEPRESSION OF THE MULTIPLIER KEY
- A. INTERLOCK 87629 INTERLOCKS KEYS ON EITHER SIDE OF DEPRESSED KEY.
- B. LOWERS PARALLEL BAR 36650C
  1. ROTATES START AND STOP LEVER 36713 TO START MOTOR
     - a. INTERLOCKS CLEAR LINKS
  2. ROCKS 36685D COUNTER CLOCKWISE
     - a. PULLS LOCKBAR 87630 FORWARD TO LATCH DEPRESSED KEY DOWN AND ALL OTHER KEYS UP
       1. RAISES LATCH 36795 FROM PATH OF 36765
       2. POSITIONS 36705 FOR KEY RELEASE
     - b. LATCH 36682 ON 36685D ENGAGES LATCH RELEASE 36663 ON 36650C
     - c. PERMITS 36698 STARTING CONTROL LEVER TO ROCK
  3. STUD 36654 ON 36650C ROCKS 36771 ON 36770 UP TO ENGAGE LUG ON 36765 FOR SELECTION
  4. RAISES BLOCKING LEVER 36793 FROM IN FRONT OF 36790
  5. INTERLOCKS DIVISION PINNING ASSEMBLY
  6. INTERLOCKS ADD BAR
  7. POSITIONS ROLLER 72366 IN PATH OF 36653
  8. PERMITS 36698 TO ROCK AND ENGAGE HATCHET ON DRIVE GEAR TO START SETTING CYCLE
- C. KEY LATCHES DOWN IN PATH OF SELECTION BAR 36765
- D. RATCHET 57505 DRIVES 36701 FORWARD AGAINST STUD ON 36580B THUS OPENING SETTING CLUTCH

II. SETTING CYCLE (NORMAL AS IN ADDITION EXCEPT AS FOLLOWS)
- A. CAM 27685D THROUGH LINK 36780 ROCKS PAWL 36636 OUT OF GEAR 36559 OF 36625B
- B. CAM 27640 THROUGH FOLLOWERS 36570A, LINK 36775 & 36770 PULLS SELECTION BAR 36765 FORWARD TO LIMIT AGAINST DEPRESSED KEY.
  1. POSITIONS 36790 & 36659 FOR COUNT OUT DETERMINED BY THE DEPRESSED KEY.
     - a. RELEASES 36645A TO ROCK COUNTER CLOCKWISE THUS RELEASING 36445C
     - b. 36645C IS ALLOWED TO ROCK UNDER MAIN CLUTCH RELEASE DOG 38440 THUS HOLDING MAIN CLUTCH OPEN UNTIL END OF COUNT OUT
- C. CARRIAGE DIP
  1. DISENGAGES 36695A FROM RATCHET PREVENTING SETTING CLUTCH REOPENING
  2. RELEASES LATCH 36682 ON 36685D ALLOWING 36682 TO POSITION FOR LATCHING LOCK BAR ON KEY RELEASE
  3. 72685B LATCHES BY 72686
  4. LIVE POINT ON 27210A POSITIONS BEHIND 72551 ON 72540E FOR AUTOMATIC SHIFT
  5. INTERLOCKS DIVISION PINING ASSEMBLY
  6. POSITIONS COUNTER MECHANISM TO POSITIVE (UNLESS XNE IS SHOWN ON COUNTER CONTROL KNOB OR IN THE NEGATIVE POSITION)
  7. INTERLOCKS SHIFT
  8. HOLDS SWITCH BELLCRANK IN ITS ROCKED POSITION TO KEEP POINTS CLOSED
  9. INTERLOCKS MAIN OPERATING BAR

D. CAM 27636 ON 27685D RELEASE LINK 36780 AND PAWL 36636 THUS HOLDING SELECTION UNTIL COUNT OUT STARTS
E. CAM 27685D ROCKS 36595B
   1. ROCKS 36705 CLOCKWISE PULLING LOCK BAR 87630 REARWARD TO LATCH ON 36682 (IN CASE KEY IS BEING HELD DEPRESSED)
      a. LATCH 36795 IS ALLOWED TO RESEAT BEHIND LUG ON SELECTION BAR 36765
   2. FORCES 36650C UPWARD IF KEY IS RELEASED AT THIS TIME
      a. STUD ON 36650C RELEASES 36771 ON 36770
      b. SELECTION SETTING MECHANISM NORMALIZES
   3. WITHDRAWS MAIN CLUTCH RELEASE DOG 38440
      a. RELEASES MAIN CLUTCH
      b. RELEASES ACTUATOR CENTRALIZER LATCH MECHANISM
      c. LOCKS COUNTER POSITIONING PIN
      d. MAIN CLUTCH RELEASE DOG LATCHES BY 36445C ROLLER LATCH

III. MAIN CLUTCH CYCLE (NORMAL AS IN ADDITION EXCEPT AS FOLLOWS)
   A. FOR EACH CYCLE OF MAIN CLUTCH, TRIP GEAR 36640 DRIVES 36661 AND 36790 ONE TOOTH OR ONE COUNT
   B. BLOCKING LEVER 36793 RESEATS IN FRONT OF STUD ON 36790
   C. 36790 CONTACTS EAR ON 36645A ROCKING IT COUNTER CLOCKWISE
      1. 36645A ROCKS 36445C FROM UNDER MAIN CLUTCH RELEASE DOG THUS STOPPING MAIN CLUTCH
         a. 38440 RELEASES RESTORE LEVER
         b. RELEASES COUNTER POSITIONING PIN
         c. RELEASES ACTUATOR CENTRALIZER MECHANISM

IV. RESTORE CYCLE (NORMAL EXCEPT AS FOLLOWS)
   A. LIVE POINT 27210A ROCKS 72540E IT IN TURN OPENS SHIFT CLUTCH FOR AUTOMATIC SHIFT
   B. STUD 72678 CAMS LATCH 72686 UP RELEASING 72685B ALLOWING STARTING ARM TO RE-ENGAGE RATCHET

UNITS & TENS TEST

I. ON CURRENT MODELS AND WITH 22965B, 22960, 22015B, AND 92268B THE FOLLOWING PROCEDURE SHOULD BE FOLLOWED

A. ADJUST UNITS TEST IN "GUIDE" DIAL (#10) TO "GUIDE" SENSING LEVER (#1)

1. UNITS TEST SHOULD BE BETWEEN 4.5 AND 5.5

B. ADJUST 6-UNITS TEST

1. 6-UNITS TEST SHOULD BE BETWEEN 24 AND 34

a. ENTER 6 IN FIRST KEY SECTION AND 94 IN NINTH AND TENTH DIAL. HOLD OUT SECOND SENSING LEVER AND DIVIDE. THE MACHINE SHOULD OVERSTROKE AND STOP WITH A 34 IN THE DIALS.

b. REDUCE THE 94 ONE NUMBER AT A TIME UNTIL NO OVERSTROKE OCCURS (28 BEING PREFERRED)

c. IF THE TEST IS ABOVE 34 BEND THE ROLLER ARM IN THE "GUIDE" DIAL DOWN AND THE SENSING LEVER DOWN UNTIL THE UNITS READING IS AGAIN BETWEEN 4.5 & 5.5

d. IF THE TEST IS BELOW 24 BEND THE ROLLER ARM IN THE "GUIDE" DIAL UP AND THE SENSING LEVER UP UNTIL THE UNITS READING IS AGAIN BETWEEN 4.5 & 5.5

2. THIS TEST WILL POSITION THE TAIL OF THE SENSING LEVER IN PROPER RELATIONSHIP WITH THE DIVISION GATE EXTENSION AND THE TENS EAR IN POSITION TO CONTACT THE STOP SHAFT 17161. THE 6-UNITS TEST CAN VERY ANYWHERE FROM 24 TO 34 WITH A READING OF 28 BEING PERFERRED. THIS BEING A "GUIDE" DIAL AND A "GUIDE" SENSING LEVER TEST, IT TELLS US WHERE THE EXACT OVERSTROKE OCCURS, WHICH GIVES US A BETTER ANALYSIS OF THE CONTROL. AS WE KNOW, TWO MINIMUMS OR TWO MAXIMUMS ARE NOT IDEAL AS A "GUIDE" BY RAISING OR LOWERING BOTH THE SENSING LEVERS AND THE ROLLER LEVER, WE CAN EASILY OBTAIN A "MIDDLE-OF-THE-ROAD" READING

3. IT IS NOT NECESSARY TO CHECK THE 6-UNITS TEST IN ANY OTHER DIAL EXCEPT THE "GUIDE" DIAL

C. TO BE DOUBLY SURE WE HAVE THE "GUIDE" DIAL AND THE "GUIDE" SENSING LEVER IN POSITION TO BE USED AS A "GUIDE", WE CAN USE THE FOLLOWING

1. ADJUST THE SECOND SENSING LEVER TO THE "GUIDE" DIAL FOR A UNITS READING OF BETWEEN 4.5 AND 5.5

2. ADJUST THE ELEVENTH DIAL TO THE SECOND SENSING LEVER FOR A UNITS READING OF BETWEEN 4.5 AND 5.5

D. WE ARE NOW IN POSITION TO CHECK THE TENS TEST IN THE SECOND SENSING LEVER BY HOLDING OUT THE FIRST SENSING LEVER. THE TENS TEST SHOULD BE 7/4. IF IT IS NECESSARY TO BEND THE TENS EAR ANY MORE THAN .010, IT INDICATES WE ADJUSTED THE "GUIDES" DIAL TO A MINIMUM OR A MAXIMUM ALLOWING FOR AN UNEVEN BALANCE

1. IF THE TENS TEST READING IS 8/5, WE COULD VERY EASILY HAVE AN 8/6 TENS TEST, WHICH IS TOO HIGH, OR IF WE HAD A 6/3 READING, WE COULD EASILY HAVE A 5/3 or 6/2, EITHER OF WHICH IS TOO NEAR A MINIMUM AND A MAXIMUM. IF OUR TENS TEST IS 8/5 AND THE TENS EAR CLEARS THE STOP SHAFT 17161, NO FURTHER BENDING WILL LOWER THE TENS TEST AND IT IS TO OUR BENEFIT TO FIND THIS OUT AT THIS EARLY STAGE, SINCE TO COMPLETE THE TEST WOULD ONLY NECESSITATE OUR HAVING A START OVER.

a. BY LOWERING THE "GUIDE" SENSING LEVER SLIGHTLY, AND THEN LOWERING THE #10 ROLLER LEVER TO AGAIN OBTAIN A PROPER UNITS READING, WE WILL SLIGHTLY LOWER OUR 6-UNITS TEST. HOWEVER, IT WILL STILL REMAIN BETWEEN 24 AND 34.

b. AGAIN ADJUST THE UNITS TEST IN THE SECOND SENSING LEVER TO THE "GUIDE" DIAL AND THE ELEVENTH DIAL TO THE SECOND SENSING LEVER. THIS WILL ALLOW THE TENS EAR TO RAISE AND CONTACT SHAFT 17161. WE ARE NOW IN POSITION TO LOWER THE TENS EAR IF NECESSARY

2. IF THE TENS TEST IS 6/3, WHICH IS THE LOWEST ALLOWABLE READING, AND THE TENS EAR ON THE SENSING LEVER IS BENT UP, BENDING IT FURTHER IMPLIES THAT OUR "GUIDE" DIAL AND "GUIDE" SENSING LEVER ARE OFF

a. BY LOWERING THE "GUIDE" SENSING LEVER AND THEN LOWERING THE #10 ROLLER LEVER TO AGAIN OBTAIN A PROPER UNITS READING, WE WILL SLIGHTLY LOWER THE 6-UNITS TEST. HOWEVER, IT WILL STILL REMAIN BETWEEN 24 AND 34

b. AGAIN ADJUST THE UNITS TEST IN THE SECOND SENSING LEVER TO THE "GUIDE" DIAL AND THE ELEVENTH DIAL TO THE SECOND SENSING LEVER. THIS WILL ALLOW THE TENS EAR TO RAISE AND CONTACT SHAFT 17161. WE ARE NOW IN POSITION TO LOWER THE TENS EAR IF NECESSARY

c. THE SENSING LEVER <u>MUST</u> BE <u>LOWERED</u> AND NOT RAISED IN BOTH CASES, SINCE WE ARE ONLY CORRECTING THE RELATIONSHIP BETWEEN THE TENS EAR AND THE STOP SHAFT 17161

E. NOW THAT OUR "GUIDE" DIAL, "GUIDE" SENSING LEVER AND THE DIAL AND SENSING LEVER TO THE LEFT OF OUR "GUIDES" HAVE BEEN ADJUSTED, WE CAN, BY PLACING THE FIRST SENSING LEVER IN LINE WITH THE NINTH DIAL, CHECK THE TENS TEST IN THE TENTH DIAL BY HOLDING OUT THE FIRST SENSING LEVER. WITH THE CARRIAGE IN THE SAME POSITION, WE CAN CHECK AND ADJUST THE UNITS READING IN THE NINTH DIAL.

1. SHIFT THE CARRIAGE OVER ONE POSITION TO THE LEFT AND REPEAT

2. REPEAT IN ALL CARRIAGE POSITIONS TO THE RIGHT. IT IS NOT NECESSARY TO CHECK THE REMAINING DIALS AND SENSING LEVERS TO THE LEFT IN THIS MANNER

a. IN MANY CASES, WHEN A TENS READING IS 8/6 OR 6/3, IT CAN BE LOWERED OR RAISED BY SHIFTING THE CARRIAGE TO THE RIGHT ONE POSITION TO CHECK THE UNITS READING

b. IF IT IS 5.7 OR 4.9, BENDING THE ROLLER LEVER DOWN OR UP <u>SLIGHTLY</u> WILL CHANGE THE UNITS READING ONLY A FEW TENTHS.

c. SHIFT THE CARRIAGE BACK TO THE LEFT AND RE-CHECK TENS TEST. THE SLIGHT DECREASE IN THE UNITS WILL GIVE A CORRECT TENS TEST

F. ADJUST THE REMAINING SENSING LEVERS TO THE "GUIDE" DIAL TO A UNITS TEST BETWEEN 4.5 AND 5.5

G. ADJUST THE REMAINING DIALS TO THE SENSING LEVER IN THE EXTREME LEFT KEY SECTION TO A UNITS TEST BETWEEN 4.5 AND 5.5

UNITS AND TENS TEST

H. ADJUST THE 9 TENS BY PUTTING A 9 IN THE EXTREME LEFT KEY SECTION ONLY, WITH THE CARRIAGE IN THE EXTREME LEFT POSITION. PUT 10 IN THE DIALS WITH THE ZERO IN LINE WITH THE 9 AND DIVIDE. NO OVERSTROKE WILL OCCUR. CONTINUE TO INCREASE BY 1's AND DIVIDE UNTIL THE MACHINE OVERSTROKES. THE REMAINDER IN THE CARRIAGE IS OUR TENTATIVE 9 TENS TEST

1. SINCE ALL OF THE DIALS AND SENSING LEVERS HAVE NOW BEEN ADJUSTED, EXCEPTING THE EXTREME END ONES, OUR 9 TENS TEST IN THE ELEVENTH TO THE NINETEENTH DIALS SHOULD READ THE SAME WHETHER HIGH OR LOW
2. RAISE OR LOWER THE TAIL OF THE ELEVENTH SENSING LEVER FOR VISUAL ALIGNMENT WITH THE TAILS OF THE REMAINING SENSING LEVERS.
3. ADJUST THE 9 TENS TEST IN THE TWENTIETH DIAL BY ADJUSTING THE ROLLER LEVER TO READ THE SAME AS THE MAJORITY READING IN THE ELEVENTH TO THE NINETEENTH DIALS
4. THE 9 TENS TEST IS ADJUSTED BY MOVING THE INTERPONET 22018 UNTIL, WITH THE TAIL OF THE SENSING LEVER CARRIER (TENS EAR) AGAINST THE STOP SHAFT, THERE IS 1/64" FREE MOVEMENT OF THE BALANCING LEVER
5. THE 9 TENS TEST IN THE LEFT KEY SECTION SHOULD NOW BE CHECKED IN ALL CORRESPONDING DIALS
6. ADJUST THE TENS TEST IN THE EXTREME END SENSING LEVER ONLY BY BENDING THE TENS EAR IF NECESSARY

I. THE TENS TEST CAN BE SPOT-CHECKED IN ALL KEYBOARD ORDERS AND ONLY IN RARE CASES IS IT NECESSARY TO ADJUST THE TENS EAR ON THE CARRIER

II. TENS TEST EXPLANATION

A. A READING OF 7/4 TELLS US THAT THE DIVISION GATE IS STOPPED BY THE SENSING LEVERS WHEN THE UNITS DIAL IS RAISED TO 7
   1. THE DIVISION GATE IS THEN HELD BY THE SENSING LEVER FOR THREE TENTHS UNTIL THE UNITS DIAL IS REDUCED FROM 7 TO 4, AT WHICH TIME THE DIVISION GATE IS RELEASED TO FORCE THE ROLLER LATCH FROM UNDER THE MAIN CLUTCH RELEASE DOG.
   2. THE LOWER FIGURE OF THE TENS TEST READING SHOWS US THE MARGIN OF SAFETY WE HAVE BETWEEN THE TIME THE DIVISION GATE IS RELEASED AND THE ROLLER LATCH IS FORCED FROM UNDERNEATH THE MAIN CLUTCH RELEASE DOG.

B. THUS, IF THE LOWER FIGURE IS 2, THE CALCULATOR WOULD MORE THAN LIKELY OVERDRAFT IN DIVISION, SINCE THE DIVISION GATE WILL BE RELEASED TOO LATE TO ALLOW THE MAIN CLUTCH TO CLOSE BEFORE THE DIALS IN THE CARRIAGE HAVE BEEN REDUCED TO ZERO. THE OPPOSITE HOLDS TRUE IF THE LOWER FIGURE IS 6. FOR THIS REASON, THE TENS READING MUST BE BETWEEN 8 AND 3.

DIVISION - "M" MODEL

PART NUMBER & NOMENCLATURE	SECOND SETTING	SECOND RESTORE
DIVISION RESTORE CAM - 27201B	SAME AS FIRST SETTING	220° - PICKS UP 38029A 240° -260° - DWELL INSURES LIVE POINT POSITIONING TO MISS HATCHET EAR 260° - BEGINS RESTORE OF 36580B 310° - COMPLETES RESTORE OF 38029; PICKS UP ROLLER LATCH
SELECTION LOCK CAM - 27035A	SAME AS FIRST SETTING	NO ACTION
SELECTION CAM - 27020B	SAME AS FIRST SETTING	NO ACTION
MAIN CLUTCH STARTING CAM - 27685B	SAME AS FIRST SETTING	NO ACTION
REVERSE CAM - 27090A	65° -90° - LOWERS 22175 TO RESTORE AND LATCH SENSING LEVERS; ROCKS REVERSE OPERATING FORK 52455B 80° DISENGAGES HATCHET PLUS STROKE LINK FROM 36065 85° DISCONNECTS SETTING CLUTCH OPENING LEVER	SAME AS FIRST RESTORE
LOCK PAWL CAM - 27185D (rightmost of two cams)	SAME AS FIRST SETTING	SAME AS FIRST RESTORE
CARRIAGE DIP CAM 27140D - RIGHT 27185D - LEFT	SAME AS FIRST SETTING	210° - STARTS CARRIAGE RISE 235° - STARTS TO DRIVE AUTO SHIFT LEVER THROUGH 27210A 285° - COMPLETES CARRIAGE RISE AND SHIFT INITIATION
SENSING RETRACTING CAM - 27969	NO ACTION	NO ACTION

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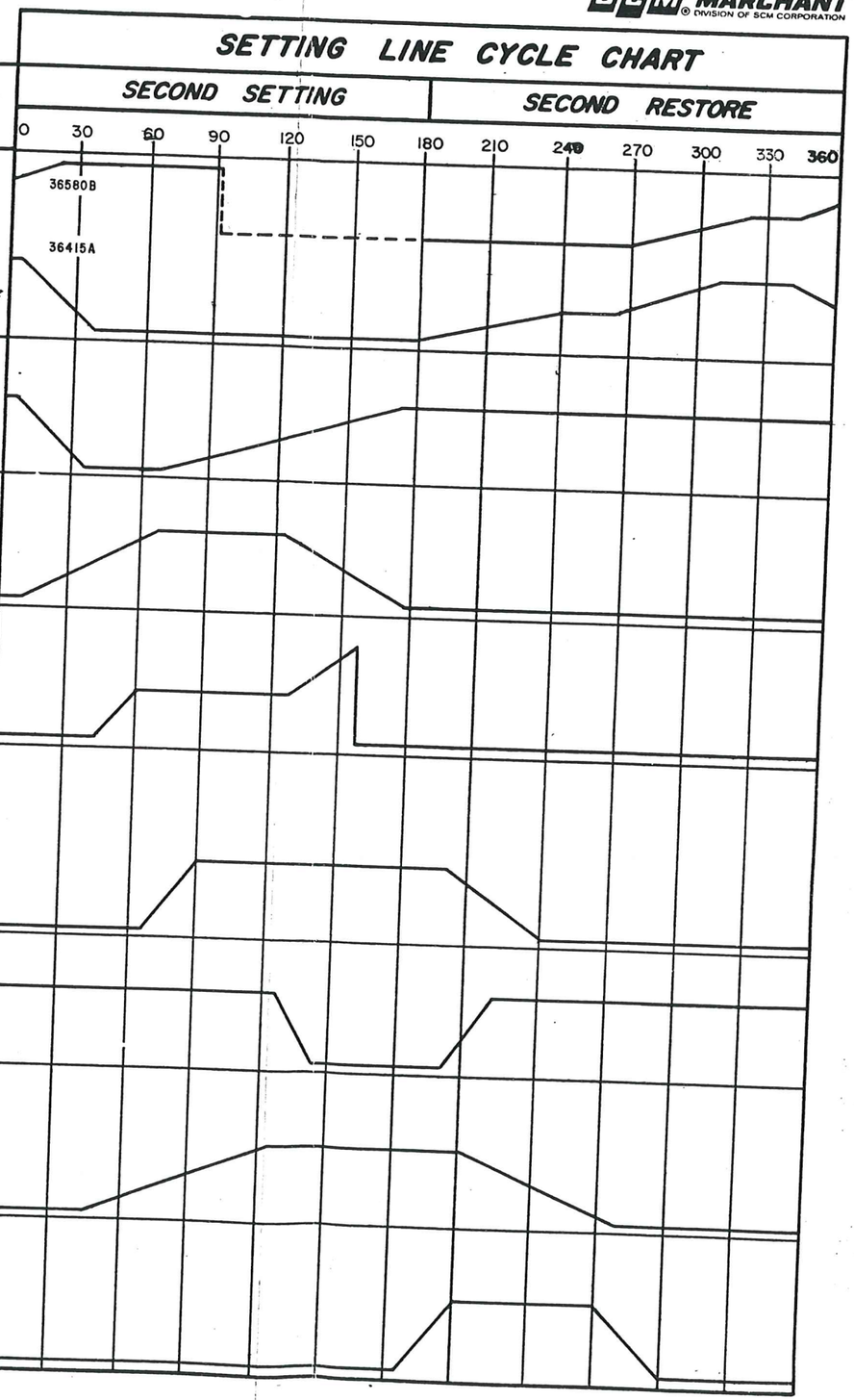
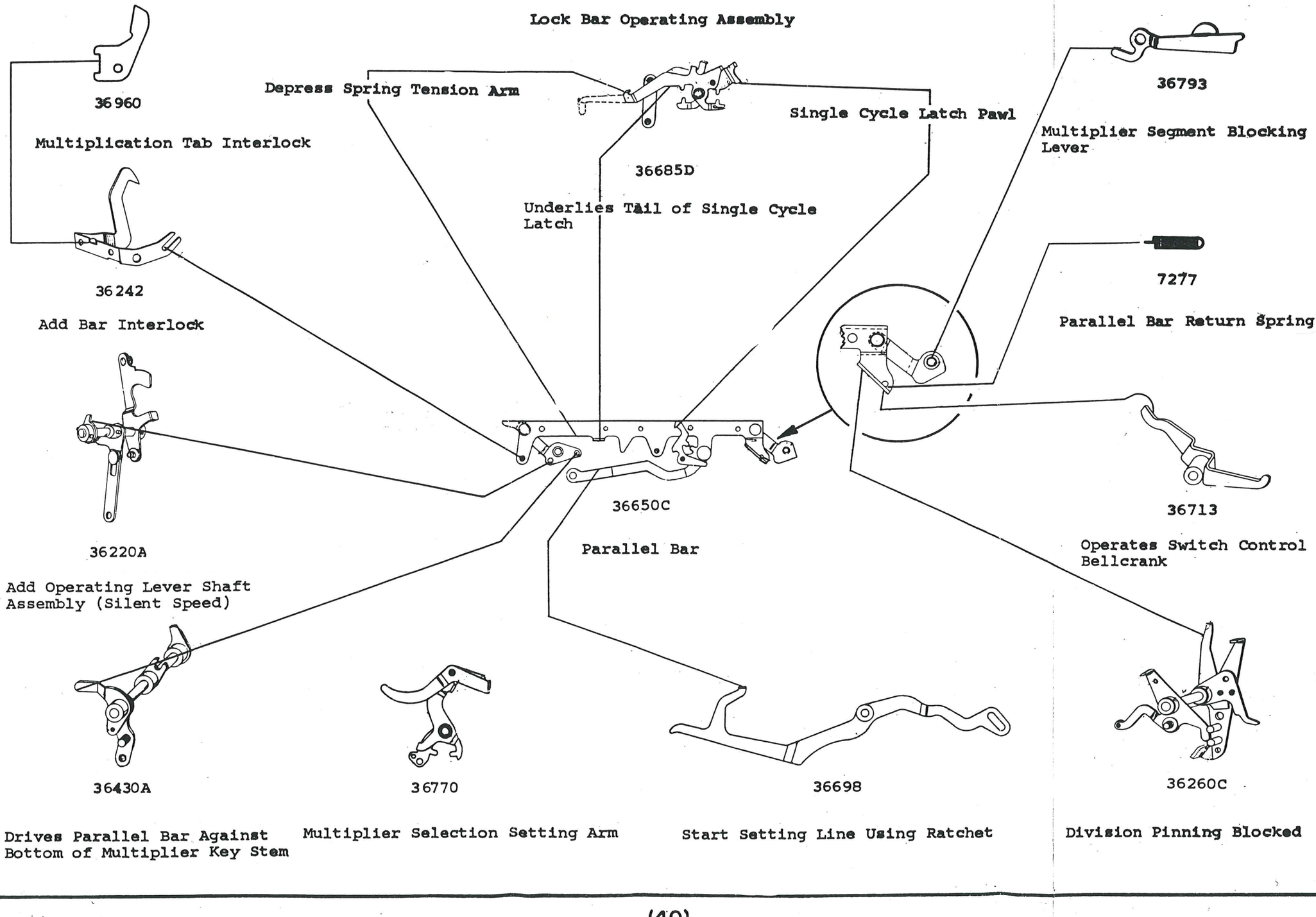
SETTING LINE CYCLE CHART



MULTIPLICATION, SCHEMATIC



DIVISION PINNING, SETTING OPERATION

Removing Stud 37298 to Counteract Non Shift Key Depression

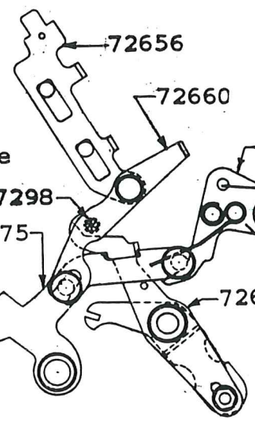
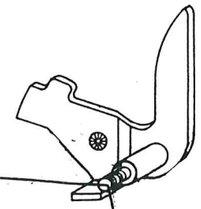


Fig. 8

Surface Blocks Negative Multiplier Key

Non Shift Latch Positioned for Last Restore Shift Block



36385B Fig. 9

Blocking, Parallel Bar

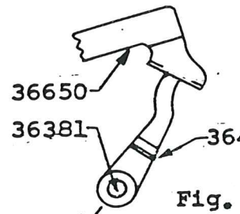


Fig. 1

Interlock Division Pinning Assembly While Carriage Is in Dip

Fig. 2

Division Key Linkage: Rocks Division Pinning Assembly

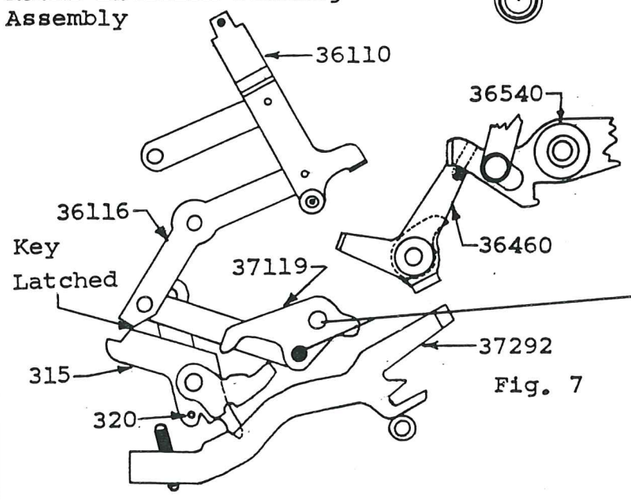
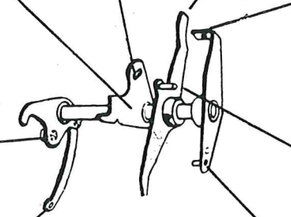


Fig. 7



Positions Upper Dial Counter

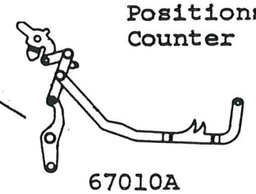


Fig. 3

Stud 36402* Raises Zero Linkage thereby Disabling Zero Shift by Removing Stud 72708 Above 72715

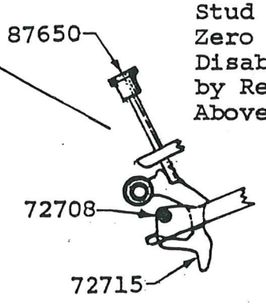


Fig. 4

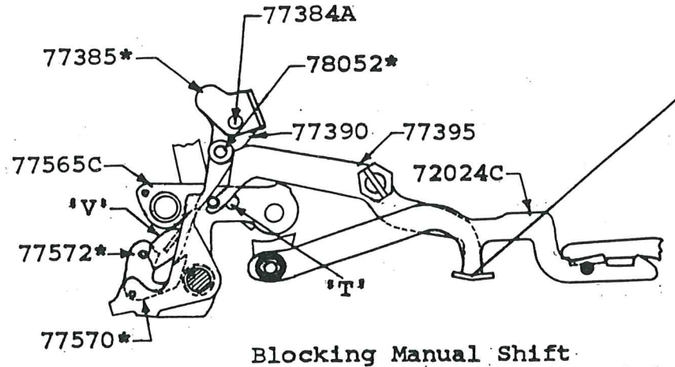


Fig. 6

Blocking Manual Shift Blocking 77330 at Point 'T' Disabling Stud 77572* at Point 'V'

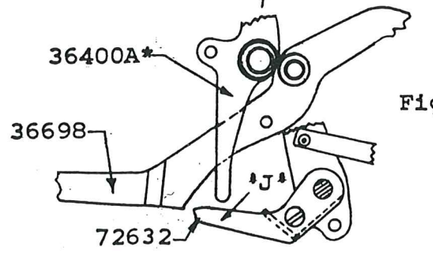


Fig. 5

Ear 'J' Blocks Pinning Assembly During Shift Operation

Upper Stud: Blocking Clear Return and Disabling Middle Dial Clearance

Lower Stud: Initiates Upper Dial Clearance, then Blocks Upper Dial Linkage

DIVISION HATCHET OPERATION, SETTING CYCLE

C. Roller Releases Hatchet 37375 & 'F' Latch 37072C*

B. Blocks Addition & Subtraction

Fig. 16

A. Positions Hammer for Left Shift

D. Latches Key Linkage Assembly

36105

37320

E. Re-Positions Stop Key Linkage

Fig. 17

'F' Latch 37072C* Latches Hatchet After Restore 37072C*

Positions Plus Stroke Drive Link in Front of Plus Stroke Bellcrank

Fig. 15

37065

Positions 'T' Member 22180

Fig. 14

37375

Roller on top of Hatchet Rocks 37155A, thus positioning for Negative

37155A

Fig. 10

Roller Lowers Main Operating Bar 37140A, thus Opening Setting Clutch

37140A

Fig. 11

Stud on Hatchet Assembly Rocks Front of 72540E, thus Disabling

72540E

Fig. 12

Removing Trip Link from Roller Latch on 'M' Models only

Fig. 13

DIVISION HATCHET OPERATION, SETTING CYCLE

ADDITION & SUBTRACTION - "M" & "D" MODELS

PART NUMBER & NOMENCLATURE	SETTING CYCLE	RESTORE CYCLE
SELECTION LOCK CAM - 27035A	10° -70° - POSITIONS FEELER FINGERS 130° -170° - RESTORES FEELER FINGERS	NO ACTION
SELECTION CAM - 27020B	10° -35° - RETRACTS LOCK GATE FROM SELECTION LEVERS; RAISES SHIFT LOCK INTO CARRIAGE 70° -170° - ENGAGES LOCK GATE WITH SELECTION LEVERS; LOWERS SHIFT LOCK	NO ACTION
KEYBOARD CLEAR CAM (D MODEL ONLY) 27088A	20° -175° - ASSURES BLOCKING OF ROLLER LATCH 170° -175° - CLEARS KEYBOARD	NO ACTION
MAIN CLUTCH STARTING CAM - 27685D	40° -60° - LOWERS MAIN CLUTCH DOG 36545C TO BLOCK 36580 150° - CLEARS KEYBOARD 130° -160° - LOWERS MAIN CLUTCH DOG 36545C FARTHER TO OPEN MAIN CLUTCH; RESTORES ADD HATCHET AND 36650C	NO ACTION
REVERSE CAM - 27090A	65° -90° - ROCKS REVERSE OPERATING FORK 52455B 85° - DISCONNECTS SETTING CLUTCH OPENING LINK	200° -240° - RETRACTS SETTING CLUTCH OPENING LINK THROW OFF LEVER
LOCK PAWL CAM - 27185D (rightmost of two cams)	125° -140° - RETRACTS ACTUATOR PAWLS	195° -220° - ENGAGES ACTUATOR PAWLS
CARRIAGE DIP CAM 27140D - RIGHT 27185D - LEFT	40° -125° - DIPS CARRIAGE	210° -285° - RAISES CARRIAGE
RESTORE CAM - 27201B	0° -30° - OVERSTROKES 36580B RELEASES ROLLER LATCH 90° - RELEASES ROLLER OF 36580B	260° -360° - RESTORE OF 36580B PICKS UP ROLLER LATCH

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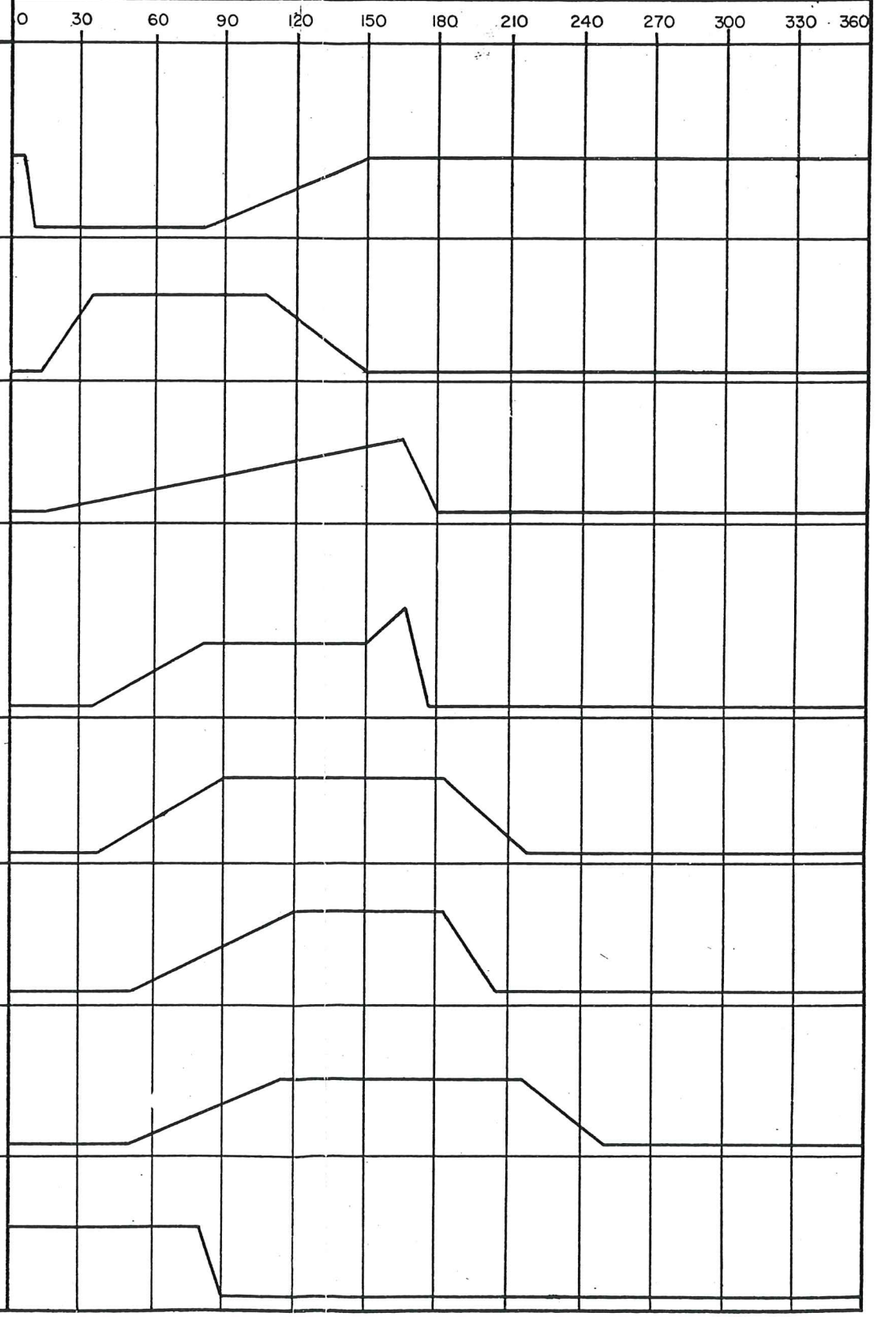
SETTING LINE CYCLE CHART



SCM MARCHANT DIVISION OF SCM CORPORATION

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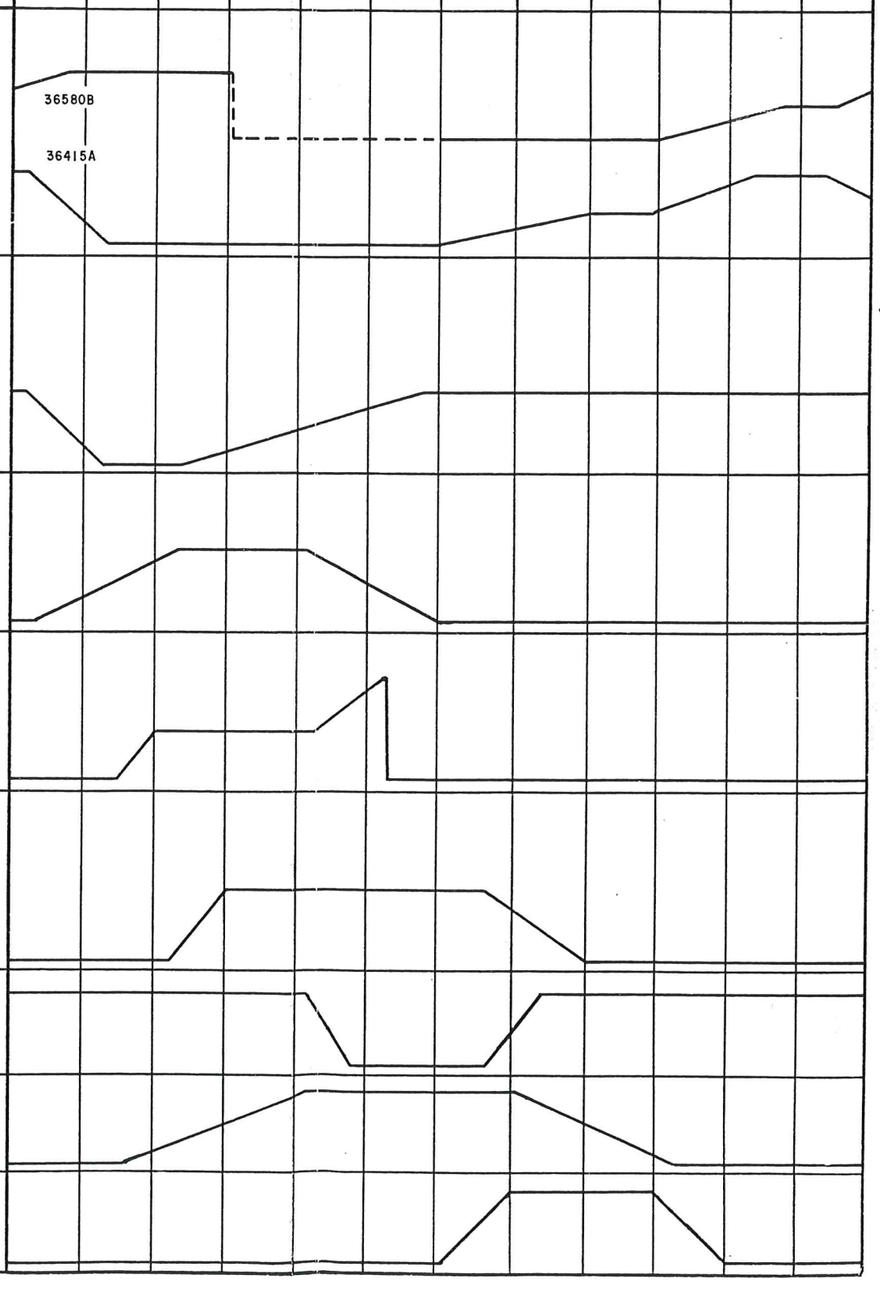
DIVISION - "M" MODELS

PART NUMBER & NOMENCLATURE	FIRST RESTORE	FIRST SETTING
DIVISION RESTORE CAM - 27201B	5° -40° - 36415A RELEASES 38029A AND POSITIONS TO RESTORE DIVISION HATCHET. REMOVES ROLLER LATCH BLOCK 0° -30° - OVERSTROKES 36580B 90° - RELEASES 36580B	210° - PICKS UP DIVISION HATCHET 220° - PICKS UP 38029A 240° -260° - DWELL TO INSURE DISABLING AUTO SHIFT 260° - BEGINS RESTORE OF 36580B 310° - COMPLETES RESTORE OF 38029A AND HATCHET. PICKS UP ROLLER LATCH 340° -360° - RELEASES DIVISION HATCHET TO "F" LATCH
SELECTION LOCK CAM - 27035A	10° -35° - RETRACTS LOCK GATE FROM SELECTION LEVER; RAISES SHIFT LOCK INTO CARRIAGE 70° -170° - ENGAGES LOCK GATE WITH SELECTION LEVERS; LOWERS SHIFT LOCK 32185 AS CARRIAGE DIPS	NO ACTION
SELECTION CAM 27020B	10° -70° - POSITIONS FEELER FINGERS AND DELAY LATCH 130° -170° - RESTORES FEELER FINGERS AND RELEASES DELAY LATCH	NO ACTION
MAIN CLUTCH STARTING CAM - 27685B	40° -60° - LOWERS MAIN CLUTCH DOG 36545C TO BLOCK 36580B 130° -160° - LOWERS MAIN CLUTCH DOG 36545C FURTHER TO OPEN MAIN CLUTCH	NO ACTION
REVERSE CAM - 27090A	65° - PULLS 22175 DOWN TO RELEASE SENSING LEVERS 65° -90° - ROCKS REVERSE OPERATING FORK 52455B 85° - DISCONNECTS SETTING CLUTCH OPENING LEVER	200° -240° - RAISES 22175; RETRACTS SETTING CLUTCH OPENING ARM THROW OFF LEVER
LOCK PAWL CAM - 27185D (rightmost of two cams)	125° -140° - RETRACTS ACTUATOR PAWLS	210° -285° - RAISES CARRIAGE
CARRIAGE DIP CAM 27140D - RIGHT 27185D - LEFT	40° -125° - DIPS CARRIAGE	195° -220° - ENGAGES ACTUATOR PAWLS
SENSING LEVER RETRACTING CAM - 27969	NO ACTION	185° -210° - RETRACTS SENSING LEVERS 210° -270° - HOLDS SENSING LEVERS 270° -300° - RELEASES SENSING LEVERS

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